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The Nancy Burbidge Memorial Lecture

MAY, 1983

Emeritus Professor B.J. Grieve

It is a great honour to be asked to give this third Nancy Burbidge Memorial lecture, and to be able to pay a tribute to this great Australian botanist. It is perhaps all the more appropriate as this was her home State and she claimed this University of Western Australia as her alma mater. She obtained her B.Sc. Hons degree in 1937, majoring in Botany, followed by her M.Sc. in 1945 and finally a well-earned D.Sc. in 1961.

I first met Nancy when she attended the ANZAAS Perth meeting in August 1947. This meeting was held only a month or so after I had myself arrived in Perth to head the Botany Department at the University.

Looking back on the Conference one of my more vivid recollections was of the time when Nancy gave a paper dealing with "The Species Concept in relation to Eucalyptus". The redoubtable Charles Gardner was present and after about 20 years as Government Botanist he was generally regarded as the authority on West Australian flora. When at the end of her paper he rose to comment and beetled his formidable Huxley-like eyebrows at her, I, for one, being new to the scene, almost held my breath wondering what broadside might come. However, the questions while searching were reasonable and Nancy answered them quite unconcernedly and effectively. I concluded that she had probably got accustomed to C.A.G.'s ways as a student here. I recall also that at this ANZAAS meeting we felt the necessity to do something to push the case for the publication of the Flora of W.A. by C.A. Gardner, which we understood was nearing completion. Nancy Burbidge and Stan Blake were the ones who spear-headed a resolution from Section M (Botany) to the General Council of ANZAAS which approved it. It recommended that the Federal and Western Australian Governments be urged to expedite the publication of the urgently needed Flora of Western Australia. This probably had some catalysing effect as Part I (The Gramineae) of the Flora was published in 1952. Sad to say however, this was not followed up and it remains the only part published in Gardner's lifetime.

At this ANZAAS meeting Nancy was elected to be the first official secretary of the Systematic Botany Committee. By the time of the next ANZAAS meeting in Hobart in 1949 she was well versed in this role and had also begun to take a wider interest in ANZAAS affairs and procedures. I recall that at the Brisbane meeting in 1954, when I had the honour of being President of Section M, Nancy was a tower of strength to me always rallying round to help. I had the feeling that perhaps I rated some special support as having become, so to speak, an adopted son of her loved home State.

Nancy used to revisit Perth from Canberra whenever she could and we could usually count on her for a seminar dealing with her botanical researches or in more recent years, on the progress of the then New Flora of Australia project.

In 1961 she was awarded the prestigious degree of Doctor of Science in the University of W.A. Important components of her submission were her major paper dealing with the Phytogeography of the Australian Region together with supporting published studies on *Triodia*, *Helichrysum*, *Nicotiana* and other genera. The manuscript of her invaluable reference work "Dictionary of Australian Plant Genera", which at that time was in press, was also submitted.

As time went on, Nancy faced an increasingly heavy burden in administering the rapidly growing Herbarium Australiense and in planning its new building. But she still managed to find time for her research and also took an increasing interest in the planning for the project dealing with the new Flora of Australia. So much so that in 1973 she was seconded from Herbarium Australiense to become the Director for the project. There are many of you here tonight who will be in a position to appreciate how much of the solid foundation work was done by Nancy Burbidge. The publication of the first volume of the new Flora to coincide with the International Botanical Congress at Sydney in 1981 owes much I am sure to the way in which she developed the firm base for the project. It was indeed sad that she died in 1977 such a few years before the project came to fruition. It is however, very pleasing to learn that her Card Index of all the specific and intra-specific names that had ever been published for Australian plants has been completed and put on microfiche by ABRs. It will thus have an extended use as an invaluable tool for taxonomic research as Nancy had envisaged. Likewise, it is also a pleasure to note that her important work dealing with the genus *Vittadinia*, which was nearing completion when she died, has now been finished by her colleagues at Herbarium Australiense and published.

The name of Nancy Burbidge will be long remembered in the annals of Australian botany. In her chosen field she was given great service both as a research worker and as an administrator. As a person she radiated cheerfulness and confidence and in the help and stimulation she gave so unstintingly to others she has carried on the Burbidge tradition of service. As her father, Archdeacon Burbidge, is remembered particularly for his work in the Bush Brotherhood and as her mother is remembered as an educator and well-loved "Mrs Brownie" of Kobeelya School, so will Nancy be remembered as one of our truly dedicated botanists.

In asking me to give this memorial lecture the ASBS council through the Secretary, Dr Judy West, suggested that many members might be interested to know something of the early history and development of the books entitled "How to Know Western Australian Wildflowers. A Key to the Flora of southwestern Australia", and of my own involvement with it. So I shall try to give you some account of the project. It is necessary to go back a long way into the past to the time when at Melbourne University I received word that I had been appointed to take charge of the Dept. of Botany in the University of W.A. I recall that one of the first things I did was to see what I could find out about the flora of W.A. from the University library. I found to my surprise that Western Australia was the only State in Australia which did not possess a published Flora. The only recent professional work I could find, apart from research papers, was a list of species (*Enumeratio Plantarum Australiae Occidentalis*) which had been published by C.A. Gardner, Government Botanist, in 1930. The only way to identify plants there was apparently still to use Bentham's 80 year old "Flora Australiensis". I must confess that I began to wonder how difficult it might be to teach important aspects of botany without a modern flora treatment. However, I was pleasantly surprised when I arrived in Perth to find that Mr Gardner was in fact Honorary Lecturer in Taxonomy for Agricultural Science and Science students and that Mr R.D. Royce B.Ag.Sc., also from the Herbarium, was in charge of the practical classes. Consequently, the lack of a State Flora, while it still seemed deplorable, was perhaps not so acute a problem as I had expected. Further I was soon shown by Mr Gardner a bulky pile of the typed manuscript of his new Flora which was nearing completion. I gathered that its publication was being held up by lack of funds. This in fact was the reason why, as I mentioned earlier, that at the 1947 ANZAAS conference a resolution was passed urging the Federal and State Governments to facilitate its publication.

Towards the end of 1948 another development concerning the flora occurred. The Senate of the University was approached by a solicitor representing the

family of the late Dr Blackall, who wished to enquire whether a partly finished manuscript dealing with the identification of W.A. plants could be examined with a view to its possible completion and publication. The letter to the University Senate stated, and I quote: "For many years prior to his death in 1941, Dr Blackall was deeply interested in the flora of W.A. and was closely associated in this work with the Government Botanist. He had started to prepare a book which he described as 'A Key to the Flora'. His idea was to supplement the major work on which the Government Botanist is and will for many years to come, be engaged. Dr Blackall's family are anxious that this work should be completed and published and they would also like to see the work finalized in W.A. where Dr Blackall lived and worked during the greater part of his life. They have therefore requested me to ascertain from you whether if they were to present the original manuscript and the fair copy as far as it has gone, to the University, the University would be prepared to have the work completed by the Head of the Botany Department and published in due course". I should add at this point that at the time of his death in 1941 Dr Blackall possessed an extensive herbarium of some 5000 specimens. This however, had been donated to the State by Mrs Blackall shortly after her husband's death. During the war years it was arranged for the collection to be housed in the basement of the Museum building. The Blackall solicitor in his letter stated that "no doubt it would readily be made available to enable the Head of the Botany Department to undertake the above work". The University Senate decided that the manuscript should be forwarded to me for examination and report. Upon examining the pages of the fair copy and the rest of the notes and rough keys and drawings, I must say that I was most impressed. This was a highly professional work by a trained, albeit medical, scientist who also had in mind the needs of the layman in botany. I contacted Mr Gardner and discussed the matter with him asking whether, as he had collaborated and collected with Dr Blackall for so long, he could possibly take on the completion of the work. He told me however, that much as he might like to be able to do this he and his staff were completely engaged on the State Flora which had absolute priority. He would be happy nevertheless to give advice should the University Senate decide to ask me to complete Blackall's work. After further study of the manuscript and discussions with Miss Alison Baird (who had been a lecturer on the staff for some years and who had an excellent working knowledge of the flora and who recognised its potential value for students) it was agreed to report that its completion and publication would prove most useful. In the event the Senate commissioned me to complete the work and the Manager of the University Bookshop was asked to make a feasibility study for publication using the direct photographing of the fair copy pages at two-thirds natural size. Looking back I think we were hopeful that this decision to complete and publish might serve to catalyze the publication of the State Flora, and that as Dr Blackall had envisaged, the Key might complement it. In the first and perhaps slightly hurried appraisal one had been inclined to take an optimistic view of how quickly the completed fair copy at least, could be got ready for publication. However, when we got down to the nitty-gritty of it, various problems leading to delays, emerged. The first was caused by finding that much of Dr Blackall's fair copy script, together with the legends to the accompanying diagrams, was unsuitable for photographic reproduction when reduced to the size required for the book. Fortunately we had in the Department, at that time Nathaniel Speck (later Dr Speck, C.S.I.R.O.), who while teaching at Carmel had become expert in scripting. He agreed to rescript essential parts of the fair copy in what time he could spare from his research work, and also to train up a member of our technical staff, Miss Joan Rayner, in the art so that she might later continue with the work. This task proved of great magnitude and time-consuming. The second source of delay was due to the necessity to complete the Keys and make the drawings for certain genera and their species which Dr Blackall had left unfinished in the fair copy. The general family key had also to be

worked up, scientific and common name indexes to be provided, as was a glossary and a section devoted to explaining how to use the book. Again although Blackall's "camera ready" copy stopped at the Stackhousiaceae, it was found that the family Myrtaceae was in a sufficiently advanced state to warrant completion. Because of its importance for students it was completed and included. When this family was later revised it was placed in its normal Engler-Melchior position. The keys were subjected to extensive testing by staff and students in taxonomy classes and on field camps. It was found that while in general the diagram-illustrated keys worked very well, and the user could arrive at a species name which appeared correct, the lack of an actual illustration of it caused some difficulty. As there was no way in Part I of adding black and white line drawings of the species to the fair copy, attention was directed to the inclusion of as large a number as possible of colour photographs of native plants, selected for recognition value for confirmation of determinations. A public appeal together with a University grant made this possible. We also had hoped at that time to include a photograph of the late Dr Blackall but we were unable to obtain one. Through the perseverance of Dr N. Marchant a photograph was obtained many years later. The framed original hangs in the foyer of the Western Australian Herbarium. A copy of it has been included in the revised Part III.

Perhaps I may digress here to give a biographical thumb-nail sketch of the late Dr Blackall. He was born at Folkestone, Kent and as a boy became interested in wildflowers in the area known locally as the "Warren". After completing his medical degree at Oxford and London Universities he accepted the position of Medical Officer at the Fremantle Asylum. He remained there for 6 years and then went into general practice at Cottesloe. He served with the A.I.F. in France in World War I and his artistic and botanical interests are illustrated in a water colour painting of *Primula elatior*, a plant of which he found beside him in the field while resting before going into action at Mt Kemmell. On returning to Perth he resumed his practice and soon began to find time to further his interest in the native flora. During the early 1920's he met another keen botanist, C.A. Gardner (who later became the Government Botanist), and they made many collecting trips together and collaborated in a number of ways. I have been unable to find out exactly when Dr Blackall conceived the idea of producing an illustrated Key to the Flora, but it was probably in the late 1920's. In 1935 he visited the Herbarium at Kew Gardens and worked there checking identifications of his specimens. There is no doubt that he was greatly stimulated by this visit and pushed ahead faster with his work on the Key. By this time also he had taken two partners into his practice and so had considerably more time for his project. An intriguing question arises as to how Dr Blackall came to develop the illustrated key method for his work. My own view is that he may have been influenced by Gaston Bonnier whose book had been translated from French into English and published in 1917 under the title "Name this Flower".*

Bonnier, who was Professor of Botany at the Sorbonne, had taken up the philosopher Bersot's challenge made some 30 years earlier. Bersot was interested in plants but was unable to identify them satisfactorily. This led him to reflect that "Botany is one of the most deceitful sciences. As flowers are so charming one imagines that it must also be charming, but how soon one is disillusioned! How many times have I tried to become a botanist and each time I have been vanquished". Why can't the botanical savants, he wondered "devise a scheme of recognition of plants through plainly visible, marked and always united main characters, combined with suitable illustrations". Bonnier describes his early difficulties in trying to produce such a book, due to the mental blinkers imposed by his long and formal study of systematic botany; how he overcame them and made the attempt to translate the botanical characteristics, of which a trained botanist makes use without conscious thought, into language simple enough for a layman to understand.

* A copy of Bonnier and de Layens "Flore de la France" which had originally belonged to W.E. Blackall, who had bought it in France in 1918, was found in the W.A. Herbarium on 22/5/84. So the question where the illustrated Key concept came from appears to be resolved.

As I mentioned earlier one cannot be certain now of the genesis of Dr Blackall's approach, but his work does show many affinities. In fact, V.S. Summerhayes in reviewing the book for 'Nature', mentioned that it recalled the classic 'Flore de la France' by Bonnier and de Layens.

Possibly forewarned of his coming illness, Dr Blackall now stepped up further his collecting and work on the illustrated keys and to such an extent that his wife complained that it was fast becoming "a tyranny of labour". Sadly however, he did not live long enough to complete it. He died of cancer in 1941.

I return now to the completion of Part I of the key. This was achieved in 1953 and the book was published in 1954. It obviously satisfied a need as the first edition sold out within 2 years. While Part I was going through the press I had begun the working up of the next group of the plant families from the Blackall rough manuscript. This necessitated checking and making drawings from the plants in the Blackall collection which had been donated to the State and housed for safety during the war years and after, in the basement of the Museum building. They could not be obtained on loan so I had first to obtain the key from the Observatory Building (where the State Herbarium was housed at the time) and then travel across the city to the Museum. The rather dungeon-like basement room where the specimens were housed was dimly lit and there was only one small heavily barred window. This of course was not conducive to close examination of the specimens and work was slow and difficult. It was a considerable relief when in 1958, the Western Australian Herbarium having been transferred to the Dept. of Agriculture building at South Perth, room was found there for the cupboards housing the Blackall collection. This made consulting it relatively easy and also facilitated use of the overall State Herbarium collections. Because the Blackall collection was so large and representative (it also included collections by other botanists such as C. Andrews) it was in due course integrated into the main W.A. Herbarium so that the whole range of available specimens could be examined together.

The work on Part II continued somewhat slowly largely due to the heavy teaching load on the small staff over this period and my involvement for a period as Dean of the Faculty of Science. However, by 1955 twelve families (Sapindaceae - Lythraceae) had been completed. In these, in addition to the illustrations required for the various stages of the keys, outline drawings of each species dealt with were included. Feedback from students indicated that this gave them a greater degree of confidence in using the keys. As a further help it was also decided to include an indication of the botanical district or districts in which each taxon occurred. In the continuing absence of a State Flora it was also felt desirable to include the authorities for the names of the species.

In 1956 I was due to take a year's mandatory study leave and it was planned to have Part II in the press before then. In looking through the Blackall rough manuscript however, it was noticed that his treatment of the family Goodeniaceae was well advanced and it was decided (as with the similarly out of place Myrtaceae in Part I) to complete it and include it in Part II. Fair progress was made on the family and I hoped to finish it during the long vacation before going on study leave in February 1956. However, in late December 1955, Prof. Went, with whom I was going to work in his phytotron in Los Angeles, cabled me to come by air just as soon as I could so that he could brief me before he left for an extended visit to South America. So I had to take the unfinished Goodeniaceae with me. After I had got settled in at the California Institute of Technology I decided that I could perhaps work on the Goodeniaceae key on weekends. I found to my consternation however, that University libraries in California did not cater for my needs. There

was no Bentham, no Mueller Fragmenta, no Diels and Pritzel, and particularly no Krause monograph. Fortunately, one of the people to whom I mentioned this suggested that I try the Huntingdon Gardens library. He had an idea that the wife of the multimillionaire who had bequeathed his mansion to the State had been interested in the Australian flora. So I visited it. I could spend a whole evening on telling you about this fabulous place with its beautiful landscaped grounds with magnolias in bloom, a world famous collection of paintings and a magnificent library. Suffice to say that the library had every reference work I needed and I was given permission to work there each Saturday. So I was able to complete the Goodeniaceae and airmail it to Perth. Dr N. Brittan, assisted by other members of staff, kindly saw it through the press and it was published during 1956. Like Part I, it sold out very rapidly and I understand that copies almost became collectors' pieces.

Following my return from study leave in 1957, work continued on what was to become Part III. By now it was becoming apparent that Blackall's notes were much less complete so that a lot more working up and preparation of keys and drawings was necessary. An increasing need was also felt to check the Blackall herbarium specimens against types or other authenticated specimens.

Fortunately, I was able to spend a reasonable amount of time at the Herbarium of the Royal Botanic Gardens, Kew, during 1962 and 1963 and working under the tutelage of Dr Melville, made considerable progress. Mr R.D. Royce, by now Curator of the W.A. Herbarium, was very helpful, forwarding to Kew those specimens of the Blackall collection that I needed, together with a number of other specimens which he thought might be useful.

Now, I should mention at this point that during the early stages of work on Part III, a new editor who had worked with Cambridge University Press had been appointed to the Univ. of W.A. Press and had decided that Part III should be printed rather than photographically produced. We proceeded on the basis that the scripted keys needed only to be legible and not professionally scripted as for the earlier photographic method. However, by the time I got back from England a change in the editorial staff had occurred and the new editor wished to stay with the original photographic method. This of course resulted in quite a delay while the book was properly rescripted. Its publication finally took place in 1965.

The concluding Part IV, comprising the 15 families Solanaceae to Asteraceae, took longer again to work up as Blackall's contribution now was becoming minimal. However, by this time, under a University grant, I had a Graduate Assistant working with me, so that the actual preparation went along smoothly. I was able also to spend a study leave year at Kew in 1970 and although I had to spend some time in hospital, considerable progress was made. One of the suggestions that had been made to improve the usability of the book was that the illustrated key method should be extended to include the General Classification and the Key to the Families. This was agreed desirable and was implemented in due course. We also followed the example of F. Mueller in providing a section dealing with 'Short Cuts to Identification'. More information was provided on distributions, flowering times, flower colour, habit etc. so that the book served as more than a Key. The family Goodeniaceae which as mentioned earlier had been included in the original Part II because it was available, was revised and placed in its correct Engler-Melchior position in this volume. The manuscript was completed in 1973 and forwarded to the University of W.A. Press. However, by now a new editor had joined their staff and he was determined that Part IV should be printed. It proved to be a rather complicated and sometimes frustrating operation, but the book was finally successfully published in 1975. By this time I had retired, but as an Honorary Research Fellow I was involved in the preparation of a combined paperback edition of Parts I, II, and III. This was published in 1974. It was next suggested that in the continuing absence of a modern State Flora (Charles Gardner had died in 1969 with no more than the Gramineae ever having been

published), Parts I-III be revised. In proceeding with this it was decided that the most practical approach would be to revise first the Myrtaceae from the original Part I, transfer it to its correct position in the Engler-Melchior system in Part III and revise the rest of the families therein. Because of the extent of the revision in the families Myrtaceae-Lamiaceae and the consequent increase in size, Part III was published in two parts, IIIA in 1980 and IIIB in 1981. By this time the paperback Parts I-III, having been reprinted in 1975 and 1978 were together with Part IV now out of print. Because of the public demand, in particular for Part IV because it contained the illustrated general family Key this was given priority in preparing a new edition. An interesting feature of this time was the explosion of taxonomic research and publication which was occurring. The result of this was that Part IV, although only published a few years earlier, was now in need of considerable revision. The new edition required a Supplement of + 100 pages to provide for the inclusion of 9 new or re-instated genera and 40 new species together with 100 new combinations or name changes. This 2nd edition of Part IV was published in 1982.

Work on the revision of the rest of Parts I and II continues and it is expected that the next section will be completed in 1984 and published in 1985. Many people, too numerous to mention individually, have helped in one or other aspect of this Blackall project. Here I can only make a general acknowledgement and thank the staffs of the Botany Dept., University of W.A., the Western Australian Herbarium and the Herbarium at Kew, together with many interstate botanists for their generous and continuing help. To the Australian Biological Resources Committee I am most indebted for the provision over a period of years, of a grant which, among other things, enabled the employment of a Graduate Assistant part-time for + 1½ days per week. I am most appreciative of their dedicated help. The inclusion of high recognition-value colour photographs (described by a Kew reviewer as 'superb') in Parts III and IV, and those that will be included in forthcoming revised parts, has been made possible by generous donations to the University of W.A. by Mrs E. Humphreys, by the Wildflower Society of W.A. and by the donation of royalties becoming available from the sale of the books. The majority of the colour photographs were taken by the late Mr F. Humphreys.

I very much doubt whether in the nature of things, namely the situation originally involved, the time scale and magnitude of the work (there are over 12 000 figures representing the characters of the species alone in the original Parts I to IV), and the potential impact of modern computer technology, that we shall ever see again a repeat of this concept of an illustrated key to a rich flora, as that begun so long ago by the late Dr Blackall. However, I believe that his vision has more than served its purpose. The feedback from the thousands of Western Australian wildflower enthusiasts, botany students and others who have been introduced to their plant heritage by the use of these illustrated keys, has indeed been favourable.

I should like again to thank the ASBS for asking me to speak this evening and I trust that this account of the Blackall story may prove of interest.

The Chelsea Physic Garden

ORIGIN

The first botanic gardens in Western Europe, and as we know them, in the World, were set up in the rich High Renaissance city-states of Northern Italy. Pisa had the first, in 1543. Two years later gardens in Padua and Florence were opened and the predominant university schools of medicine followed at Bologna, Leiden, Montpellier, Oxford and Edinburgh, in little over a century. Their titles varied: Hortus medicus, Hortus botanicus, Giardino dei Simplici, Jardin des Plantes or, in this country, Physic Garden. But their roles were similar, which were to grow plants for recognition and study for medicinal and general scientific use.

The Chelsea Physic Garden is unusual and perhaps unique amongst the numerous and varied institutions in Britain devoted to the scientific study of plants. Most botanists know it as the second oldest physic garden in England, about fifty years younger than the one at Oxford and nearly a hundred years older than the Royal Botanic Gardens at Kew.

The name needs at first to be clarified, since, amongst the early botanic gardens, Chelsea only has retained its original epithet. This gives rise to a confusion about its aims which is heightened by the knowledge that the garden was founded by and for the Worshipful Society of Apothecaries of London. Moreover, that was in 1673 when the word physic still had its original meaning of "pertaining to things natural" as distinct from the metaphysical. The modern use of the word seems to refer only to the physic of doctors and hence visitors are apt to expect a garden devoted solely to the culture of medicinal herbs.

Here then, only two and a half miles from Piccadilly Circus lies, like an oasis, rather under four acres of some of the most intensively cultivated ground in the country. Since the Garden's inception the roles have been twofold: educational and scientific. These hold good today and a continuum of botany, medicine and related subjects can be traced through good times and bad for over 300 years.

Naturally, the particular interest of apothecaries was with officinal plants. But in a period when Paracelsian ideas still held sway, that every plant would cure something, if only the antidote and disorder could be brought together, every plant species was a potential remedy. Hence plants grown extended beyond those known (or currently believed) to be efficacious and were continually being added-to by new species from new worlds.

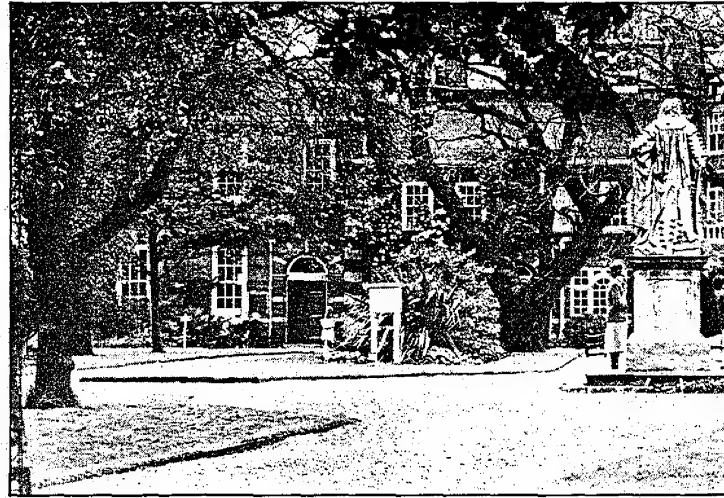
HISTORY

At the Chelsea Garden, things were not at the beginning, in 1673, all plain sailing and clearly not all the early Gardeners (as the Curators were then termed) were up to the job of promoting a new botanic garden. Nevertheless within ten years from its foundation, and now in the care of John Watts, himself an Apothecary, its importance was sufficient for Paul Hermann, the Professor of Botany of Leiden University, to visit it. Watts returned his visit in 1683 to exchange seeds and plants with Leiden. So began a mutual exchange with other botanic gardens throughout the world, a process which has continued ever since (in 1975 for example, over 2 500 packets of seeds were sent out and 1 500 species received). Amongst the plants brought back by Watts from Leiden were four young *Cedrus libani*.

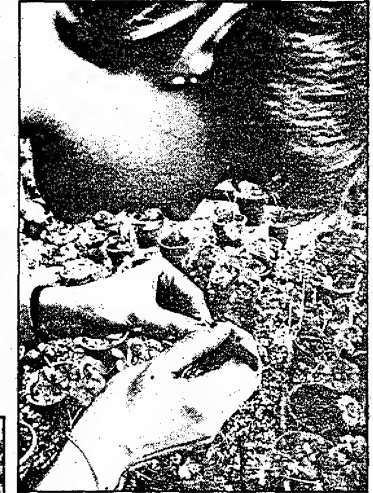
These were among the first to be planted in England and surprised the contemporary world by succeeding so well. The Chelsea cedars dominate all post



The pelargoniums are objects of research



Botanists, as well as plant lovers, make good use of the historic gardens



In 1722, Sloane granted a lease *ad perpetuam* on 3 acres, 1 rood and 35 perches, plus greenhouse, stoves and barge-houses, to the Worshipful Society of Apothecaries. The garden had fallen into some neglect when the new head gardener, Phillip Miller, took over. He immediately set about delivering the 50 plant specimens, pressed and mounted, required annually as part of the lease, and he went on to write a *Dictionary of Gardening*. Linnaeus's botanical classification was not adopted until the 7th edition, but Miller's book is still recognised as the first modern encyclopaedia of horticulture.

Miller described a new species of Madagascan periwinkle (*Vinca rosea*), which is still being used in cancer research. Chemists have isolated more than 60 alkaloids from the plant, and it has since been renamed *Catharanthus roseus*. Vinblastin sulphate, one of these alkaloids, has been tested in the US for the treatment of Hodgkin's disease, and another, vincristine, provides a possible treatment for leukaemia. Also during Miller's time, the first cotton seeds were sent to Georgia in exchange for native American seeds.

The garden flourished for more than a century. William Curtis (founder of the *Botanical Magazine*) was head gardener when Sir Joseph Banks, in the late 1700s, brought back from his travels enough Icelandic tufa for a rock garden.



upgrade the facilities and build new greenhouses. There will be a school (The English Garden School), and since last April the garden has hosted six lectures.

Chelsea's library contains all the original plant lists and the

Elizabeth Blackwell published a *Curious Herbal* with engravings of 500 plants grown in the garden. Banks also supplied 500 packets of seeds from his world voyage, and one long-term associate of the garden, Nathaniel Bagshaw Ward, developed a technique of transporting living tropical plants. The Wardian Case, a miniature portable greenhouse, allowed tea plants to be taken from Shanghai to the foothills of the Indian Himalayas, and rubber plants from Brazil to Malaya.

Then, sadly, the construction of the embankment road changed the water table in the garden; the third Lebanon cedar was felled, a greenhouse was sold off. By the end of the last century, pharmacists were losing interest in botany and the garden was virtually closed. But botanists perceived its value to students, and today the garden hosts many university research projects. Julie Westfold, a cytologist, is doing research with pelargoniums, mostly South African species, for the Natural History Museum.

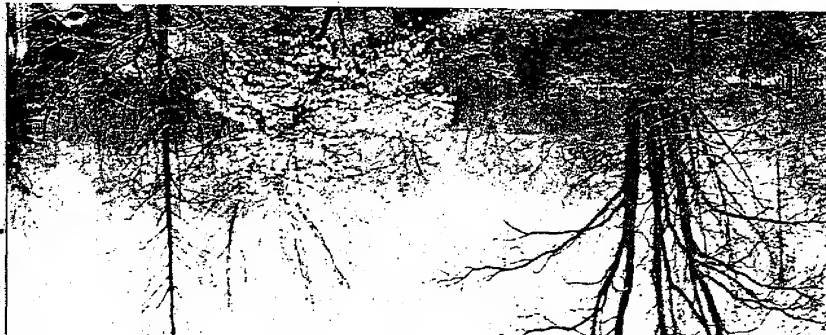
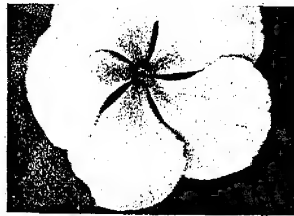
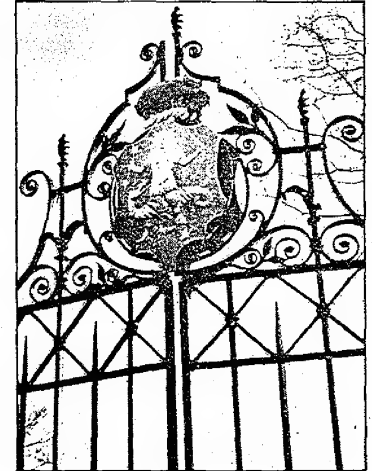
Scientists at Imperial College, London, have studied pollution on plants at Chelsea, and are researching ergot fungi on rye. Chelsea College biologists are exploring feverfew (*Tanacetum parthenium*) as a potential cure for migraine. Philip Briant, the garden's administrator, says there are plans for a new bed to establish seed stocks of native wild flowers and one for vegetables threatened by the EEC's regulations.

Briant is optimistic about the future of the garden, but it may need powerful friends. The garden starts its public life with a grant of just £60 000 from the National Heritage Fund and a modest bequest from the old trustees (The City Parochial Foundation), but it needs more like £1 million to

herbaria of John Ray, Samuel Dale, and Isaac Rand, and a rare copy of John Parkinson's *Paradisi in sole Paradisus Terrestris*, published in 1629.

The garden contains 5000 species of plants. On the north side there are those used in homeopathy; plants for perfumery, dyers greenweed and woad; and culinary herbs. To the south, sloping to the river, systematic beds contain a hundred genera, from *Ranunculaceae* to *Gramineae*, and across the path a mixed collection of shrubs with wild peonies such as the rare *Paeonia cambessedesii* which is endemic to the Balearic Isles. Nearer the river is a pond with flowering rush, overhung by a dawn redwood; next to it, a definitive collection of *Hypericum*. In midwinter, I came upon a mimosa (*Acacia dealbata*) tucked away in the southwest corner and overlooking the cytologists' fern house: it was aglow in yellow blossom.

The garden will open again on 22 April 1984 at £1.00 per head (children and students with cards, 50p) on Wednesdays and Sundays between 2 and 5 pm. It is well worth a visit. The number to ring for further information is 01-352 5646. □



17th century illustrations of the Garden: they took up so much space in the garden that two were felled in 1771. (The last, weakened by London's increasing atmospheric pollution, survived until 1904).

John Evelyn, diarist and author of the famous "Sylva" came to Chelsea in 1685 and writes of plants he saw. He was particularly impressed by the "subterraneous heat conveyed by a stove" which heated the conservatory. Unfortunately, in the 1690's, Watts appears to have lost interest and with his enthusiasm the Garden declined as well. Incomplete records of the next thirty years tell a confused story of monetary troubles and lack of direction. But help was at hand.

Having bought the Manor of Chelsea from Charles Cheyne in 1712, Dr Hans Sloane had become owner of the Garden's freehold. By fortunate chance, Sloane, now a wealthy and influential man (he was created a baronet in 1716), had studied at the Garden during his early training as a physician. Now the Apothecaries appealed to him and in 1722 he virtually refounded the Garden by granting a lease to the Society at £5 a year in perpetuity, laying out in legal terms conditions to guarantee the Garden's existence, "on condition that it be for ever kept up and maintained by the Company as a physick garden". To make sure that it was so kept, Sloane's conveyance required 50 plant specimens from the Garden to be delivered annually to the Royal Society, until 2 000 pressed and mounted species had been received. In fact by 1795, when the flow ceased, the total had reached 3 700.

A further check on the running of the Garden came with the institution of the post of Praefector Horti (Directo) in 1724. Isaac Rand was its first holder and John Lindley its last in 1853.

Cheyne and Sloane are names well commemorated in this area of London, but the latter's memorials more truly lie in the Garden and with the British Museum which was founded with his collections including the herbarium sheets of the Garden's plants, now housed at the British Museum (Natural History) in South Kensington. They provide a valuable source of information about plants in cultivation during the 18th century.

Sloane's other major benefit to Chelsea was instigating the appointment of Philip Miller with the title of Gardener in 1722. Miller became the greatest botanical horticulturist of his century, developing Chelsea as the finest botanic garden in the world; superlatives seem to become the order of the day when this man is discussed. A contemporary panegyric by Peter Collinson, himself no mean botanist, is recorded: "Mr Miller of the Physic Garden, Chelsea, has made his great abilities well known by his works as well as by his skill in every part of gardening and his success in raising seeds procured by a large correspondence.

"He has raised the reputation of the Chelsea Garden so much that it excels all the gardens of Europe for its amazing variety of plants of all orders and classes and from all climates as I survey with wonder and delight this 19th July, 1764".

Miller's reign at Chelsea extended for nearly 50 years, during which time his famed Dictionary of Gardening ("Non erit Lexicon Hortulanorum, sed etiam Botanicorum" Linnaeus is reputed to have said of it), ran through eight editions during his lifetime. Carl von Linne, the great Swedish botanist, had paid a visit to the Garden in 1733 recording in his diary that "Miller of Chelsea permitted me to collect many plants in the garden". He was, however, somewhat scornful of Miller's cautious approach to botanical innovation. Conservative by nature, Miller was slow to change his normal practice but in the 7th edition of his Dictionary he adopted Linnaeus' botanical

classification and in the eighth the binomial nomenclature which Linnaeus had introduced nearly 20 years before. These innovations make it the first modern encyclopaedia of horticulture and it is still of current practical value. Many species first described by Miller in the Dictionary retain today the names he gave them.

During these years cotton seeds were sent out from the Garden to found the staple crop of the new colony of Georgia, and in return the Americas continually provided seeds of new species which Miller was especially proficient at germinating.

One significant exotic arrived from Madagascar via the Paris Jardin des Plantes which nicely epitomises Chelsea's unique continuum of history and research. Miller described this new species and in 1759 Linnaeus gave it the name *Vinca rosea*: it was a periwinkle. From Chelsea it was distributed to other gardens whence it has escaped to roadsides in many tropical areas.

Modern enquiry has shown this plant to be a source of clinically important alkaloids - over 60 have been isolated from it - which are used in the treatment of cancer. Now named *Catharanthus rosea*, this Madagascan periwinkle is one of the major species used in biochemical research.

For the cultivation of tropical plants Chelsea's facilities were good: in 1732, Sloane laid the foundation stone of a fine new greenhouse designed in the classical orangery mode and it was in use the following year. There were library and meeting rooms above and the main block was flanked by lean-to houses which were heated both by stoves and by beds of fermenting tan-bark. Sadly, this elegant structure was demolished in the middle of the 19th century when nearby sewer construction seemed likely to undermine the foundations of the building which was already in want of structural repair.

Michael Rysbrach's white marble statue of Sir Hans Sloane commissioned at this time by the Apothecaries was originally erected here but was moved to the present dominating position in 1748.

Miller was succeeded as Gardener in 1770 by William Forsyth (after whom *Forsythia* is named). He was joined by William Curtis in the post of Praefector Horti and Demonstrator of Plants. Curtis was author of the *Flora Londinensis* "one of the most beautiful and accurate works on British plants" and originator of the Botanical Magazine which is still published and bears his name.

The Garden was a continual source of material for botanical illustrations: Elizabeth Blackwell lived in adjacent Swan Walk while she produced her "Curious Herbal", and the celebrated Georg Dionysius Ehret married Miller's sister-in-law.

The famous Chelsea porcelain too, used material from the Garden for illustrating its coveted botanical plates.

During Curtis' time, the earliest rock garden in the country was built in the Garden. It comprised many tons of old building stone from the Tower of London; to which was added a quantity of basaltic lava brought by Sir Joseph Banks from Mount Hecla in Iceland. This unaesthetic pile was significant as an early attempt to grow plants in an ecological arrangement. Some of Banks' lava can still be seen.

So many of the men associated with the Garden have been, like Forsyth, commemorated in plant generic names that the list comprises a botanical pantheon second to none. Here we meet: *Hermannia*, *Doodia*, *Milleria*, *Houstonia*, *Sherardia*, *Randia*, *Martynia*, *Linnaea*, *Ehretia*, *Banksia*, *Solandra*, *Hudsonia*, *Haworthia*, *Lindleya*, *Fortunearia*, and so on; a noble roll indeed.

In the next few decades, the Garden continued to flourish, though some of its activities had to be curtailed during the Napoleonic Wars which merely accentuated rather than caused the difficulties of obtaining new plants from abroad: Miller's correspondence, years before, is peppered with references to lost and delayed shipments and arrival of dead specimens. It is easy to forget now the problems of transport then experienced. Appropriate it was Nathaniel Bagshaw Ward, subsequently Examiner for Prizes at the Apothecaries Society and in 1853 its Master, who provided the key to the transport of living plants across the world. He observed in 1829 the behaviour of plant growth in closed glass jars and wrote to Sir William Hooker about his experiments. (By profession Ward was a doctor practising in London's East End.) The significance of his botanical work was quickly recognised in that Faraday lectured on the subject in 1838.

Practical developments led to the invention of "Wardian Cases" like small sealed greenhouses, which made possible the introduction of countless tropical plants to European gardens. On an economic scale Chinese bananas were shipped to Fiji and Samoa, 20 000 tea plants were taken from Shanghai to the Indian Himalayan foothills (this was done by Robert Fortune, himself Curator at the Physic Garden from 1846 to 1848) and in 1876 Brazilian rubber (*Hevea brasiliensis*) travelled via Kew and Ceylon to Malaya. Such projects transformed the agricultural pattern of whole countries.

As the 19th century waxed, so the importance of the Garden waned, despite the extremely successful and well attended lectures delivered by Dr John Lindley over a period of 17 years from his appointment as Demonstrator, Director and Professor of Botany to the Society.

During the latter half of the century the Garden underwent another of its recurring financial crises. The Society of Apothecaries of London retrenched, dispensed with Lindley and his lectures, sacked its labourers, sold one glass-house, discontinued heating another and appealed for money; by such drastic measures the Society just managed to keep the Garden going. The Physic Garden was, however, but one of their concerns. The Society played an important part in medical education, most of its members exchanging the old title of apothecary for that of general practitioner of medicine, while others became trading pharmacists, and during the century the importance of medical botany in their training grew less and less.

The Garden was certainly a financial strain, and the Society alleged that it was no longer suitable for the purpose of a botanic garden, because of the deleterious effects of increasing atmospheric pollution in London and the impoverished state of the soil, whose water table had been greatly lowered by the building of the Chelsea Embankment in 1874 which cut the Garden off from the river.

THE GARDEN TODAY

Sir Hans Sloane's lease had provided, should the Society of Apothecaries ever wish to relinquish its trust, for the Garden to be offered first to the Royal Society and then to the Royal College of Physicians, but since neither was ready to accept, an application was made by the Society to the Charity Commissioners for a Scheme.

As a consequence, in May 1897 a departmental inquiry was instituted by the Treasury with reference to a suggestion that the Garden should be supported by Imperial funds, and with especial reference to its use by the students of the Royal College of Science at South Kensington. The Treasury Committee satisfied itself that the Garden was still well fitted for botanical purposes,

and that its advantages were likely to be highly appreciated by the students of the Royal College of Science and of the various polytechnics.

Thus was closure averted. As on earlier occasions, a few men of enterprise and vision had realized the Garden's potentialities, notably the Director of the Royal Botanic Gardens, Kew, and the Professor of Botany at the Royal College of Science. The City Parochial Foundation (Trustees of the London Parochial Charities) was approached by the Charity Commissioners with a view to providing, or assisting to provide, the necessary income for the maintenance of the Garden. The Trustees having offered, on certain conditions, to provide £800 a year, and the Treasury a "yearly sum of £150 out of moneys provided by Parliament", the Charity Commissioners in February 1899, established a Scheme by which the Trustees of the London Parochial Charities were appointed Trustees of the Garden, which was to be administered by a Committee of Management consisting of Members appointed by the Trustees, the Treasury, the Lord President of the Council, the Technical Education Board of the London County Council (now the Greater London Council), the Royal Society, the Society of Apothecaries, the Royal College of Physicians, the Pharmaceutical Society, the Senate of London University, and the heir of Sir Hans Sloane.

A new Curator, William Hales, was appointed to whom, with Professor Farmer of Imperial College, much of the present layout is due. Mr Hales died in service after thirty eight years of able, zealous and faithful administration. A tablet commemorating his services to the Garden is affixed to a wall in the Library.

George William Robinson succeeded him in August 1937 and he, in turn, was succeeded in 1946 by William George MacKenzie VMH. On his retirement in 1973 Allen P. Paterson NDH MED FLS was appointed.

In the very early days of the Garden under its present management the staff consisted of a Curator, a Head Gardener and three assistants. During the course of years this was increased till the staff numbered six, including from time to time an apprentice, in addition to the Curator. At the present time the Garden has no Curator.

One of the designated rooms in the original orangery was a library. Although that building no longer exists, much of the fine collection of botanical books does. The Society of Apothecaries began to assemble the library in the early 17th century (the earliest volume is dated 1491). A large addition was made in 1739 under the Will of Dr Samuel Dale, botanist and friend of John Ray (sometimes called a father of English Botany). For over a century the valuable early herbaria of Ray, Dale and Isaac Rand were also kept here, but were transferred to the British Museum in 1853.

During the last half of the 18th century portions of the library were removed to the Apothecaries' Hall, and by 1832 the whole of it had been transferred there. However, in 1953 it was decided to return this valuable collection of books to the Physic Garden and the Committee of Management accepted it on permanent loan from the Apothecaries' Society. Through the generosity of the Trustees of the London Parochial Charities the entire collection was restored by Alfred Maltby and Son Limited of Oxford, and it seems almost certain that two of the five oak presses, in which it was housed, are the very ones ordered in 1739 by the Court of the Apothecaries' Society to accommodate the books and herbaria bequeathed to it under the Will of Samuel Dale.

In 1970 the Worshipful Society of Apothecaries requested the return to them by the Garden of the Samuel Dale collection, namely of the books and herbaria to which reference had been made above. Negotiations followed and ultimately it was agreed that the collection be retained by the Garden. Thus the Samuel Dale collection remains at the Garden and is in fact part of its endowments.

The library has been continually if intermittently augmented over the years. Two noteworthy recent groups came from the executors of the late E.A. Bowles (it included appropriately Elizabeth Blackwell's "Curious Herbal" published in 1782, mentioned above) and from Professor and Mrs W.O. James in 1973.

For some years before 1899 the Apothecaries Society had contemplated closing the Garden and acted on the supposition that it would cease to be used for botanical purposes. Consequently when the Trustees and the Committee assumed responsibility they found that the various houses and buildings had fallen into decay.

Accordingly the Trustees and the Committee erected buildings comprising lecture room, laboratory, Curator's house and glass-houses at a cost then of approximately £6,000.

From time to time further improvements have been and continue to be made in the buildings at the Garden. Furthermore it has been necessary to expend considerable effort on maintenance and replacement. All this has to be funded in the main by grants from the City Parochial Foundation and, although no very good idea of what is involved can be gained from an expression of this support in money terms alone, it may be of interest to note that over £200,000 has been spent on the Garden up to 1975.

(On 31 March, 1983, the Trustees of the London Parochial Charities ceased responsibility for the Garden. On that date, a new body of Trustees assumed responsibility for it with Mr P.R. Briant as its Administrator - P. Briant)

THE WORK OF THE GARDEN

The objects of the Charity, as defined by the Scheme of 21st February, 1899, were: "The Charity and its endowments shall be administered exclusively for the promotion of the study of Botany, with special reference to the requirements of -

- (a) General education;
- (b) Scientific instruction and research in Botany, including vegetable physiology, and
- (c) Instruction in Technical Pharmacology as far as the culture of medicinal plants is concerned".

Hence its original interests were continued and embodied in a scheme which reflected the roles of many botanic gardens at the beginning of the century.

Links with education in the succeeding 75 years are obvious; the continual availability of the Garden to students of all ages and in the copious flow of the teaching specimens through schools and colleges in London and beyond, are noteworthy. Those with research are implicit in the papers produced as a result of work done in the Garden.

The outstanding scientific achievement so far in this century has been the work of Professor F.G. Gregory and his co-workers between 1932 and 1955. This was on the control of flowering in plants (photoperiodism) and on winter chilling (vernalisation): both areas continue to be of vast economic value in food production throughout the world.

In fulfilling its third role the Garden (while emphasising again the fact that it is not a herb garden per se) cultivates a wide range of officinal and

modern drug plants and maintains links with teaching hospitals and University departments concerned with pharmacology.

In parallel with the wide availability of plant species for demonstration and study the research aspect of the Garden continues to flourish. Colleges of the University of London, Teaching Hospitals, and the Botany Department of the British Museum (Natural History) have programmes of work in train which exhibit a wide range of botanical interests.

One aspect of the British Museum is on ferns and fern allies. Biosystematic investigation of *Dryopteris* species from many habitats throughout the Northern Hemisphere is designed to throw light on the evolution of this genus. Similarly cytological (i.e. concerning chromosomes) work on *Selaginella* species, correlated with taxonomic studies, attempts to explain evolution within the group.

A second area is work on *Anacyclus* species and other Mediterranean composites in the course of which population studies and chromosome variation are being investigated in relation to the evolution of these genera.

For some years the Biochemistry Department of Imperial College has been interested in ergot alkaloids. These are used extensively during childbirth and for treatment of certain types of migraine. They have been made until recently from naturally occurring fungal fruiting bodies (sclerotia) formed in the position of a normal grain in the cereal, rye, when it is infected by *Claviceps purpurea*. (This ergot was once greatly feared as a poisonous adulterant in flour).

Work at the Garden, on plants artificially inoculated with *Claviceps*, is aimed at understanding the biochemistry of the medicinally effective material and hence at improving the design of synthetic alternatives.

Further research programmes are continuously being initiated.

It should be mentioned that the Garden is used as a site for monitoring air-borne pollutants. Whilst the killing smogs which occurred until the late 1950's have ceased, air-borne metals provide another hazard to plant and animal life. Measurements have shown that the rate of heavy metal pollution steadily increases along a transect from the laboratories to the Embankment.

In the international botanical field, the Garden's Seed List goes out to some 200 other gardens; thus the exchange of species, as begun with Leiden almost 300 years ago, continues to flourish. Closer to home, teaching specimens are supplied to schools and colleges and series of lectures are held here.

If the necessary funds can be found, the 1899 Scheme is still viable. Even in these vastly changed and changing times the availability of some 5 000 species of plants for study in Central London is truly remarkable. Nevertheless, the Garden cannot be opened to the public without restriction since the resulting pressures on a research and educational establishment would make its work impossible.

However, the Garden is always available during normal working hours to bona fide students of subjects legitimately associated with its aims and works.

In 1975 open days were provided for Fellows of the Royal Horticultural Society. These followed an experiment begun at the time of the Garden's Tercentenary and have been extended to include certain days on which members of the general public, who apply for tickets, can be admitted.

.....

Readers may be interested to know that on the western boundary of the Garden is a developing range of Australasian plants; species of *Eucalyptus*, *Senecio*, *Hebe* and members of the predominantly Southern Hemisphere family Proteaceae. These plants were being grown outdoors with no visible protection from the extremes of the local environment.

The above was reproduced from a booklet on the Chelsea Physic Garden obtained during my visit to the Garden in April 1979 as a field excursion associated with an International Museums Conference. Permission to reproduce the material has kindly been granted by Mr P.R. Briant, the present Administrator. My thanks to Mr Briant and Dr Surrey Jacobs, the current Australian Botanical Liaison Officer at Kew, who arranged for this permission.

R.J. Henderson

CLADISTICS SYMPOSIUM HIGHLY SUCCESSFUL

In this issue and the following one reports and extracts from the Cladistics Symposium held in Canberra on 18 May, and sponsored by the Society, will be presented. The meeting was highly successful and was much applauded; there was a well balanced program of invited speakers brought together from diverse geographical locations and subject areas, and the discussions were highly stimulating and informative. Organization of the meeting and its associated social functions was most efficient, and a good time was had by all. Congratulations are due to the organizers, Mike Crisp, Helen Hewson and especially Judy West. Ian Telford did a great job as caterer, and Jo Palmer and Barbara Barnsley helped at the registration and information desk.

9th General Meeting & Symposium

The next General Meeting of the Society will be held on Tuesday 12 February, 1985 in conjunction with a symposium on alpine biota to be held at Thredbo, New South Wales (see insert in this issue).

Council is anxious that the overall program has a scope which is of interest to all members of ASBS. Council is therefore interested in organizing a session of contributed papers on general or specialized topics in systematics which might be held in conjunction with, but independent of, the Alpine Symposium.

Any one interested in presenting a paper is asked to contact Judy West, Australian National Herbarium, G.P.O. Box 1600, Canberra, A.C.T. 2601.

Report from the Bureau of Flora and Fauna

Volume 22 of the *Flora of Australia* was published on 17 May, 1984. Volume 4 has been completed and is now with AGPS.

A workshop to discuss the preparation of lichens for the *Flora* was held in Melbourne on 12 and 13 May. It was recommended that the systematic arrangement follow that of J. Poelt in V. Ahmadjian and M.E. Hale, *The Lichens* (1974); that probably four volumes would be needed for the lichens; and that the first volume could be prepared by 1988. Contributors were suggested for all families in the first two volumes.

The new Guide for Contributors is almost complete and should be printed soon. A copy will be sent to each person who has agreed to contribute to the Flora.

Please note that the deadline for Volume 45 of the Flora is 30 September, 1984.

Alex George,
Acting Assistant Director, Flora

Flora of Australia

WRITING AND PUBLISHING PROGRAM (1987-1992)
(continued from Newsletter 38)

Volume 12 1 Family; 1 p.p.

Mimosaceae

p.p..c. 17 genera

Contributor: A. Kanis (CANB)

Caesalpiniaceae c. 24 genera

Contributors: D.E. Symon (ADW) *Cassia*

J.H. Ross (MEL) remaining genera

Deadline 30 April 1987

Volume 11 1 Family, p.p.

Mimosaceae - c. 900 species

Contributors: B.R. Maslin (PERTH), J.H. Ross (MEL), A.B. Court (CBG),
M.D. Tindale (NSW), L. Pedley (BRI)

Deadline 31 December 1987

Volume 48 47 Families; 141 Genera; 463 Species

Psilotaceae 1 genus, 2 species

Contributor:

Tmesipteridaceae 1 genus, 6 species

Contributor:

Lycopodiaceae 2 genera, 17 species

Contributor:

Selaginellaceae 1 genus, 9 species

Contributor: A.C. Jermy (BM)

Isoetaceae 1 genus, 7 species

Contributor: C.R. Marsden (Canberra)

Ophioglossaceae 3 genera, 10 species

Contributor:

Marattiaceae 2 genera, 2 species

Contributor:

Osmundaceae 2 genera, 2 species

Contributor:

Schizaeaceae 2 genera, 6 species

Contributor:

Lygodiaceae	1 genus, 4 species
Contributor:	
Pteridaceae	2 genera, 9 species
Contributor:	K.U. Kramer (Z)
Sinopteridaceae	4 genera, 12 species
Contributor:	
Parkeriaceae	1 genus, 2 species
Contributor:	
Hemionitidaceae	4 genera, 7 species
Contributor:	
Adiantaceae	1 genus, 8 species
Contributor:	
Vittariaceae	4 genera, 4 species
Contributor:	D.L. Jones (Queensland)
Dicksoniaceae	2 genera, 4 species
Contributor:	D.L. Jones
Dennstaedtiaceae	6 genera, 14 species
Contributor:	
Lindsaeaceae	1 genus, 14 species
Contributor:	K.U. Kramer
Davalliaceae	3 genera, 6 species
Contributor:	
Oleandraceae	3 genera, 11 species
Contributor:	
Hymenophyllaceae	19 genera, 47 species
Contributor:	J.P. Croxall
Gleicheniaceae	4 genera, 10 species
Contributor:	
Cyatheaceae	2 genera, 11 species
Contributor:	R.E. Holttum (K)
Thelypteridaceae	10 genera, 22 species
Contributor:	R.E. Holttum (K)
Aspleniaceae	2 genera, 21 species
Contributor:	
Athyriaceae	4 genera, 13 species
Contributor:	
Aspidiaceae	7 genera, 24 species
Contributors:	R.E. Holttum (K) <i>Tectaria</i> D.L. Jones (Queensland) other genera
Lomariopsidaceae	4 genera, 5 species
Contributor:	
Blechnaceae	4 genera, 25 species
Contributor:	B. Parris (K) <i>Doodia</i>
Polypodiaceae	10 genera, 26 species
Contributor:	E. Hennipman (U)
Grammitidaceae	4 genera, 18 species
Contributor:	B. Parris (K)
Platyzomataceae	1 genus, 1 species
Contributor:	

Marsiliaceae	2 genera, 7 species
Contributor:	
Azollaceae	1 genus, 2 species
Contributor:	
Salviniaceae	1 genus, 1 species
Contributor:	
Cycadaceae	1 genus, 10 species
Contributor:	
Zamiaceae	3 genera, 18 species
Contributor:	
Ginkgoaceae	1 genus, 1 species
Contributor:	
Pinaceae	1 genus, 6 species
Contributor:	
Taxodiaceae	1 genus, 2 species
Contributor:	
Cupressaceae	3 genera, 18 species
Contributor:	
Podocarpaceae	4 genera, 13 species
Contributor:	
Phyllocladaceae	1 genus, 1 species
Contributor:	
Araucariaceae	2 genera, 5 species
Contributor:	
Deadline	31 December 1987

Volume 16 & 17 2 Families; 46 Genera; 871 Species

Eleagnaceae	1 genus, 1 species
Contributor:	G. Guymer (BRI)
Proteaceae	45 genera, 870 species
Contributors:	P. Weston (NSW) <i>Persoonia</i> , <i>Athertonia</i> , <i>Hicksbeachia</i> , <i>Gevuina</i> D.J. McGillivray (NSW) <i>Symphionema</i> , <i>Cenarrhenes</i> , <i>Agastachys</i> B.P.M. Hyland (QRS) <i>Carnarvonia</i> , <i>Darlingia</i> , <i>Cardwellia</i> , <i>Hollandaea</i> , <i>Musgravea</i> , <i>Austromuellera</i> D.B. Foreman (MEL) <i>Helicia</i> , <i>Xylomelum</i> , <i>Opisthiolepis</i> , <i>Triunia</i> , <i>Floydia</i> , <i>Petrophile</i> , <i>Isopogon</i> B. Hyland & D. Foreman <i>Stenocarpus</i> , <i>Buckinghamia</i> P. Weston & L.A.S. Johnson (NSW) <i>Virotia</i> , <i>Macadamia</i> A.S. George (BFF) <i>Banksia</i> , <i>Dryandra</i> , <i>Synaphea</i> , <i>Franklandia</i> M.D. Crisp (CBG) & P. Weston (NSW) <i>Telopea</i>
Deadline	30 June 1987

Volume 21

Myrtaceae, in part	
Contributors:	L. Craven (CANB) <i>Calytrix</i> , <i>Calythropsis</i> , <i>Homalocalyx</i> , <i>Wehlia</i> A.S. George (BFF) <i>Verticordia</i> M.E. Trudgen (Perth) <i>Baeckea</i>
Deadline	30 June 1988

Volume 47 3 Families; c. 100 genera; c. 630 species

Orchidaceae

- Contributors: D.F. Blaxell (NSW) *Adenochilus*, *Arthrochilus*, *Burnettia*, *Caleana*, *Drakaea*, *Genoplesium*, *Glossodia*, *Orthoceras*, *Paracaleana*, *Prasophyllum* sect. *Micranthum*, *Rimacola*, *Spiculaea*
 M. Clements (CBG) & D.L. Jones (Queensland) *Dipodium*, *Pterostylis*
 A.W. Dockrill (Atherton) *Anoectochilus*, *Aphyllorchis*, *Apostasia*, *Cheirostylis*, *Corymborkis*, *Eria*, *Goodyera*, *Hetaeria*, *Podochilus*, *Zeuxine*
 A.S. George (BFF) *Cryptanthemis*, *Cryptostylis*, *Elythranthera*, *Epiblema*, *Eriochilus*, *Leporella*, *Lyperanthus*, *Monadenia*, *Rhizanthella*, *Spiranthes*
 B. Gray (QRS) *Bulbophyllum*, *Nervilia*
 D.L. Jones (Queensland) *Acianthus*, *Chiloglottis*, *Corybas*, *Diuris*, *Townsonia*
 P.S. Lavarack (Townsville) *Bromheadia*, *Cadetia*, *Dendrobium*, *Diplocaulobium*, *Flickingeria*, *Habenaria*, *Malaxis*, *Oberonia*, *Peristylis*
 B. Wallace (NSW) *Chiloschista*, *Drymoanthus*, *Luisia*, *Micropera*, *Mobilabium*, *Papillilabium*, *Peristeranthus*, *Phalaenopsis*, *Phreatia*, *Plectorrhiza*, *Pomatocalpa*, *Pteroceras*, *Rhinerrhiza*, *Rhynchophreatia*, *Robiquetia*, *Sacciolabiopsis*, *Sarchochilus*, *Schistostylus*, *Schoenorchis*, *Thrixspermum*, *Trachoma*, *Trichoglottis*, *Vanda*
 J.Z. Weber (AD) *Thelymitra*
 D.L. Jones, M. Clements & P.S. Lavarack *Calochilus*

Other genera to be allocated.

Deadline 31 December 1988

Volume 37

Asteraceae p.p. 154 genera, c. 590 species

Tribe

Mutiseae 1 genus, 1 species

Contributor: N. Lander (PERTH)

Vernonieae 5 genera, 7 species

Contributor: C. Dunlop (DNA)

Cardueae 18 genera, 37-40 species

Contributors: P. Michael (SYD), M. Gray (CANB) *Leuzea* and *Rhapontium* unallocated

Arctotideae 6 genera, 10 species

Contributors: P. Michael, M. Gray

Lactuceae 23 genera, 51-52 species

Contributors: H.W. Lack (B) all except *Microseris*
 B.V. Sneddon (WELTU) *Microseris*

Eupatorieae 5 genera, 7 species

Contributor: L. Haegi (AD)

Heliantheae 36 genera, 70-73 species

Contributors: P. Michael, M. Gray - *Acanthospermum*, *Ambrosia*, *Bidens*, *Calyptocarpus*, *Coreopsis*, *Cosmos*, *Eleutheranthera*, *Gaillardia*, *Galinsoga*, *Guizotia*, *Helenium*, *Helianthus*, *Hemizonia*, *Ipa*, *Madia*, *Montanoa*, *Palaforia*, *Porthenium*, *Schkuhria*, *Sigesbeckia*, *Zinnia*

Heliantheae (Cont.)

Contributors: L. Pedley (BRI) *Enydra*, *Glossogyne*, *Wedelia*
P. Michael, N. Lander *Xanthium*

Astereae 25 genera, 263-280 species

Contributors: C. Dunlop (DNA) *Dichrochlamys*, *Eurybiopsis*, *Ixiochlamys*
N. Lander (PERTH) *Erodiophyllum*, *Kippistia*, *Minuria*, *Olearia*
L.G. Adams (CANB) *Lagenifera*, *Solenogyne*
P. Michael, M. Gray *Aster*, *Conyza*, ?*Grindelia*
P. Michael *Solidago*

Anthemideae 21 genera, 54-61 species

Contributors: C. Humphries, all except *Isoetopsis*
P.S. Short (MEL) *Isoetopsis*

Senecioneae 10 genera, 67-68 species

Contributors: M. Lawrence (ADW) *Senecio*
A.E. Orchard (HO) *Bedfordia*, *Brachyglottis*
Other genera unallocated

Calenduleae 4 genera, 10 species

Contributors: P. Michael, M. Gray

Deadline 30 June 1992

Volume 38

Asteraceae p.p. 76 Genera, c. 500 species

Tribe

Inuleae (only tribe in volume)

Contributors: L. Haegi (AD) *Iriolaena*, *Leptorhynchus*, *Rutidosia*, *Blennospora*,
P.S. Short (MEL) *Actinobole*, *Angianthus*, *Asteridea*,
Blennospora, *Calocephalus*, *Cephalosorus*, *Chrysocoryne*,
Chthonocephalus, *Dithyrostegia*, *Epitriche*, *Eriochlamys*,
Gnephosis, *Hyalochlamys*, *Leucophyta*, *Millotia*,
Pleuropappus, *Podotheca*, *Pogonolepis*, *Scyphocoronis*,
Siloxerus, *Toxanthes*
C. Dunlop (DNA) *Allopterygium*, *Blumea*, *Coleocoma*, *Laggera*,
Pluchea, *Pterocaulon*, *Streptoglossa*
A.E. Orchard (HO) *Cassinia*, *Haeckeria*, *Nablonium*, *Odiria*,
Pterygopappus
A.S. George (BFF) *Pithocarpa*
P.G. Wilson (PERTH) *Cephalipterum*, *Helipterum*, *Schoenia*

Deadline 31 December 1992

DICKSONIA HERBERTII W. Hill and D. YOUNGIAE C. Moore ex Baker ARE DIFFERENT SPECIES

David L. Jones

In ASBS Newsletter 32 (September 1982) Gordon Guymer established that the name *Dicksonia herbertii* W. Hill was validly published and predated the name *D. youngiae* C. Moore ex Baker and therefore should be used for the species. I have considered for a number of years that the north Queensland population of *D. youngiae* (now *D. herbertii*) was specifically distinct from the southern Queensland and New South Wales populations. I intended to describe the northern population as a new species until informed of the existence of the name *D. herbertii* which applies to it. The differences between these two populations (see Table 1), I believe, justify their recognition as distinct species.

D. herbertii is restricted to highland rainforests of northeastern Queensland between the Johnstone and McLeod rivers with an altitudinal range from 760 m (in the Lamb Range) to 1 600 m near the summit of Mt Bellenden Ker. *D. youngiae* is widely distributed in the moister parts of north-eastern N.S.W. and south-eastern Queensland between the Richmond and Mary rivers. It ascends from lowland situations near sea level to mountainous areas above 900 m (Springbrook and Lamington).

D. youngiae has an interesting growth habit which is entirely lacking in *D. herbertii*. Accessory buds develop on the trunk and emerge as short growths which form two or three small fronds. These remain quiescent while the plant is in active vertical growth, but if the trunk falls (which it seems to do easily) then these accessory growths develop and creep across the ground as prostrate trunks. Eventually the apex of each grows erect and the inter-connecting tissue between them decays leaving each as a separate plant. Thus the species can form localized colonies primarily by a technique of vegetative increase. By contrast the trunks of *D. herbertii* are strongly anchored, grow erect and show no propensity to form accessory growths.

TABLE 1

Comparative Differences between *Dicksonia herbertii* and *D. youngiae*

Character	<i>D. youngiae</i>	<i>D. herbertii</i>
Accessory growths on trunk	present	absent
Frond surface	bright green to dark green, the surface shiny	light green to greyish-green, the surface dull
Stipe hairs	bright reddish brown, soft and tangled	dull red brown to grey-brown, stiffly spreading, sharp, brittle, irritant (readily penetrate skin)
Basal pinnae	spreading as in the rest of the pinnae	projecting stiffly inward towards the centre of the crown.

THE CASE OF THE COLLECTIVE COLLECTORS, OR, A GROUCH ABOUT GREGARIOUS GATHERERS

A.E. Orchard, Tasmanian Herbarium

Recently, while preparing a Flora treatment, I became once again painfully aware of a curious phenomenon afflicting modern plant collectors. This is their apparent tendency to gather in more or less large clusters around defenceless plants before carrying out their strange predatory rites. While older collections may have been attributed to A. Smith 962 modern ones seem to be more frequently collected by A. Smith, B. Jones, C. Brown and D. Green 962 with or without collecting numbers for each and every person.

I use the words "painfully aware" advisedly - in the Deep South high technology is an electric typewriter, and label information is consequently transcribed in longhand. Writers' cramp is an occupational hazard when 100's of specimens are involved.

While resting my aching tendons I have been moved to speculate why it is that modern collectors hunt in packs. The mind boggles at the thought of 2 or 3 ravening hunters (or even, in some cases, the entire Dimboola Field Naturalists Club) descending on a single Shrinking Violet and wrenching it collectively from the ground. Is it true that modern living has so atrophied the arm muscles of modern collectors that it takes 2 or 3 of them to collect each specimen? Or is the answer more prosaic? Do collectors try to get their name on as many specimens as possible as a form of advertising, in the same way that in some fields multi-authored papers include the names of everyone associated (however remotely) with it, even down to the charlady who washed the test-tubes? Or is it laziness, in that it is easier to put everyone's name on every specimen from an expedition rather than keep each collector's finds separate? If this latter explanation is the correct one, then there are other solutions, such as allocating all collections from one site or one day to a single individual, and all those from the next site or day to another individual.

I believe that the citation of collectors' names and numbers associated with specimens has as its main function the specification of individual collections. The aggrandisement of the collectors is very much a secondary consideration. Harassed authors and editors wishing to save space will in most cases cite the example above as A. Smith et al. 962 anyway.

My plea, reduced to its simplest form, is this. Please, wherever possible, apply Occam's Razor to subsidiary collectors, and cut down the amount of work required from my aching hands.

Chapter News

CANBERRA CHAPTER

The Canberra Chapter organised and staged the Cladistics, Systematics and Phylogeny Symposium as its major recent activity.

The structure of the Symposium was to have four invited (somewhat introductory) papers in the morning followed by contributed papers and posters in the afternoon. (Dr V. Funk was unable to attend due to ill health and we were fortunate to have Dr G. Nelson come instead). We aimed to have multidisciplinary content and participation. The interaction from the different disciplines was stimulating and there is no doubt that we achieved our aim in this respect. It was also encouraging to have participants from all States, New Zealand and of course U.S.A. It was also encouraging to have several post-graduate students among the 120 or so participants.

Roger Carolin (University of Sydney) - Mitchell's Theorem and its Impact on Biology - presented an introductory paper to the discipline of Cladistics. He discussed general principles and some of the more difficult concepts such as homology, character state polarity, rooted and unrooted trees and cladogram interpretation.

Gareth Nelson (American Museum of Natural History) - Pacific Biogeography - is a vicariance biogeographer. He discussed Croizat's panbiogeographic hypotheses especially in respect to Pacific biogeography. He attempted to demonstrate that "biogeographic data suggest that bipolar distributions are to be reckoned among the results of seafloor spreading in the Pacific". His anchovy data exemplify this notion.

Don Colless (CSIRO, Entomology) - The Wagner Olympics: Short is Beautiful - made useful comparisons between phenetics and cladistics and discussed in detail the form of numerical cladistics involving the computation of Wagner trees. He also made the point regarding the resolution of Wagner trees, that perhaps we should not worry too much about incompletely resolved cladograms. "The grain of our data may never be fine enough to provide a picture that is both clear and accurate!"

Dan Faith (CSIRO, Water and Land Resources) - Distance Wagner Procedures and the Estimation of most Parsimonious Trees - proposed an alteration to the distance Wagner algorithm which produces improved estimates of parsimony. "This new algorithm (was) compared to the original distance Wagner algorithm and to the basic Wagner algorithm in simulations".

The contributed posters and papers presented a wide range of case studies from both plants and animals (both fossil and live). Many different analytical methods, techniques and interpretations were presented.

The vigorous discussion at the end of the day helped bring things together and stimulated further informal discussion during dinner.

Our social events began Thursday evening and continued on through the weekend till Monday afternoon.

On Monday Gareth Nelson presented a talk entitled: Vicariance and Cladistics: Historical Perspectives with Implications for the Future. This is being published. Systematics Association Special Volume, No. 23, "Evolution Time and Space: The Emergence of the Biosphere", eds. R.W. Sims, J.H. Price and P.E.S. Whalley, 1983, 469-492, Academic Press.

Meanwhile our next Newsletter (No. 40) will include the abstracts of the entire Symposium and the transcripts of the more general papers of Roger Carolin and Don Colless.

The Symposium has foreshadowed the potential success of holding multi-disciplinary meetings in the future. It is pleasing to realise how easy it was to discuss the discipline of cladistics with paleontologists, zoologists, ecologists, botanists and all the other "ists" alike.

J. West & H. Hewson

MELBOURNE CHAPTER

At the May meeting of the Chapter Phillip Johnstone, Monash University, spoke on "Morphometric analysis of narrow-leaved eucalypt populations".

The peppermint group of eucalypts has had a turbulent taxonomic history. Phillip discussed some of the nomenclatural problems associated with the narrow-leaved peppermint (*Eucalyptus radiata* Sieb.). The nomenclatural problems could be due in part to the morphological variability of *E. radiata*.

He assessed morphometric characteristics for populations from the geographic range of *E. radiata*. Pattern analysis techniques revealed two major disjunctions in the morphometric variation pattern. The taxonomic significance of these discontinuities were discussed.

For our June meeting, Ian Pascoe, Victorian Plant Research Institute, spoke on "Development of a national mycological collection". Ian discussed the history, current status and future directions of mycological herbaria in Australia.

Barry Conn



CONSERVATION COMMISSION OF THE NORTHERN TERRITORY

VACANCY SENIOR BOTANIST

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ALICE SPRINGS

The Conservation Commission of the Northern Territory manages two herbaria, one in Alice Springs and one in Darwin. The position offered is Officer in Charge of the Alice Springs herbarium, directly responsible to the Commission's Assistant Director (South).

Duties are mainly supervisory, overseeing the curatorial, taxonomic and service functions of the herbarium. The position also calls for liaison with the sister herbarium in Darwin, other units of the Commission and other Australian and overseas herbaria. The successful applicant will be required to conduct and supervise projects on the flora of the Northern Territory with special emphasis on the flora of Central Australia.

As the Botany Unit is not large, the applicant could expect adequate time to conduct personal research.

Qualifications: Degree in Botany, with demonstrated ability to conduct taxonomic research. Experience in managing a herbarium would be an advantage.

Conditions of Employment: Northern Territory Public Service conditions of service apply, including:-

- . N.T. Allowance \$1,227 p.a. without dependants
\$2,149 p.a. with dependants
- . Six weeks annual recreation leave with an airfare each two years of service to an Australian capital city
- . Cumulative sick leave
- . Superannuation benefits
- . Fares and removal expenses may be paid where it is necessary to move from one location to another to take up duty

Applications, in writing, stating details of qualifications, experience, referees and a contact telephone number should be forwarded to:

The Recruitment Officer,
Conservation Commission of the Northern Territory,
P.O. Box 1046,
ALICE SPRINGS. N.T. 5750

Letters to the Editor

FLORA OF AUSTRALIA & EUCALYPTS

Without wishing to embark on a discussion of the main content of the letter by Dr J.H. Willis in Newsletter 38, I should like to clarify some points.

As will have been obvious from page one of the same Newsletter, Volume 19 of *Flora of Australia* will not automatically adopt a multigeneric concept of *Eucalyptus*. It is not ABRS policy for any of its publications, all of which are works of reference, to be the initial forum for novel generic treatments.

While it is certainly true that a grant of \$7,000 was awarded to D.F. Blaxell in 1984 for assistance to help produce formal publication on the "eucalypt" genera, this does not mean automatic acceptance of the conclusions of that work. ABRS grants are awarded to many scientists to increase the output of taxonomic research on both flora and fauna. Results from the efforts of these taxonomists will then be judged by their peers. Should novel generic or higher rank taxonomies prove widely acceptable, then it is likely that such treatments would be used by authors in preparing accounts for the Flora of Australia or Fauna of Australia.

The major ABRS publications have treatments contributed by an author, appointed by the Bureau of Flora and Fauna following advice from the relevant Editorial Committee.

I hope this clarifies the ABRS position in respect to the administration of this particular matter - the botanical discussion will clearly be an important and lively one.

R.O. Slatyer
Chairman

Australian Biological Resources
Study Advisory Committee

THE GENERA OF THE EUCALYPTS

I am concerned that some botanists, as well as foresters, wish to pre-judge the proposed generic segregations among the eucalypts and have expressed strongly held views on our proposed treatment in advance of its detailed presentation. The pressure to finish, with my colleagues Don Blaxell and Ken Hill, an assessment of all levels of the classification allows me no time and makes me unwilling to debate the matter any further until our work is completed, but the letter by Dr J.H. Willis (ASBS Newsletter 38: 13-14, March 1984) calls for reply.

As well as *Angophora*, we recognise 10 genera in what has been called *Eucalyptus*, not 20 as some have claimed. *Symphyomyrtus* has more than 500 species (not evidence of an extreme generic splitters' concept), *Eucalyptus* s. str. more than 120, and *Corymbia* more than 40. Groups such as *Adnataria* and *Maidenaria* mentioned by Willis are maintained at the level of section within *Symphyomyrtus*; they are not proposed as genera.

The majority of the actual work is an assessment of the species and sub-species, and of the subseries, series and sections. It has shown the need for many re-assessments of rank, delimitation and hierarchical structure. Also a large number of new taxa have been found in recent field work.

The approach is phylogenetic. There is no clearly defined answer, out there in nature, to the often-posed questions "Is this a distinct species?" or "Is this a distinct genus?". There are answers in nature as to the sequence of evolutionary divergence, and our most scientific aim in taxonomy, we believe, is to seek those answers by finding best hypotheses as to the pattern of descent, i.e. by phylogenetic analysis. There are other truly scientific questions associated with these, such as those dealing with adaptation, and with genetic constitution and variation of populations, but these are not so fundamentally taxonomic.

The application of names to groups, whether these groups represent branch systems of the phylogenetic tree or whether they cut across them, as they do in some classifications not considered by phylogenetic taxonomists to be well-founded, is something of an art, but an art dealing with scientific information and theory, for the purpose of communication and summary.

In the eucalypt study, our concept of species is not a highly inclusive one; it is, we believe, very much in line with that of other workers closely and widely acquainted with the group in the field as well as the herbarium and laboratory.

The intermediate levels of classification between species and genus are again not likely to upset most people - because, we would say, they are less interested in them than they could be, with advantage. In a classification reflecting as well as possible our hypotheses of the branching tree of descent, the intermediate levels are extremely important. They are also intrinsically subject to just as much scientific argument as the generic level.

The division of the eucalypts into a number of genera has in fact been suggested at various times in the past, going back to the 19th century, but the treatment by Bentham in his "Flora Australiensis" has become traditional. In "A classification of the Eucalypts" (1971) and subsequently, Lindsay Pryor and I have jointly or separately indicated that recognition of *Eucalyptus* and *Angophora* was quite illogical, especially in that two groups within *Eucalyptus* were in fact more closely related to *Angophora*. The so-called distinctions between *Angophora* and "*Eucalyptus*" (in the broad sense) that have frequently been mentioned in books and instruction to students do not in fact hold good.

We have over the years considered that there were two logical possibilities:

1. To recognise an even more comprehensive "*Eucalyptus*", which would include the species at present referred to "*Angophora*".
2. To recognise as genera a total of 11 groups (including *Eucalyptus* s. str.) of roughly the same degree of distinctness as *Angophora*. (The number would rise to 15 with the inclusion of *Arillastrum* and its 3 allies, which have not been traditionally included in the eucalypts.)

In 1971 Pryor and I treated most of those other groups as subgenera. They are distinct from each other by combinations of characters, some macroscopic and some microscopic, and also by the fact that species within each of the groups are commonly capable of interbreeding, whereas (with one possible exception) no interbreeding takes place between members of different groups.

More recently, Dr Barbara Briggs and I have carried out a fairly searching phylogenetic analysis of the family Myrtaceae, including the eucalypt groups. This analysis, which uses a very large number of characters and a critical method of numerical analysis, indicates that the eucalypt group (extended to include also *Arillastrum*, *Eucalyptopsis*, *Allosyncarpia* and an allied monotypic genus from NE Queensland) is equivalent to other groups within the family that are universally treated as comprising a number of genera. In short, the eucalypts in this circumscription would constitute a tribe, which may be called Eucalypteae.

A recent paper by Ladiges and Humphries may be brought up in some discussions. This purports to show that *Angophora* separated early from a common ancestor of the rest of the eucalypts. We have indicated at the Myrtaceae symposium in Perth in May 1983 that this study is erroneous as to some data, incomplete and unbalanced in the character-sets used, and have shown that its conclusions are not sustainable when these deficiencies are corrected. More detailed comment on this will be published.

We have considered very carefully the possibility of treating all members of the tribe Eucalypteae as a single inclusive genus, which would be called *Eucalyptus* s. latiss. While it is true that this would cause less change in publications, lists, timber specifications, reports and the like, we have concluded that, if taxonomy is to be based on scientific principles, we have no option but to recognise the distinct genera as indicated above.

These would still in fact be more clearly separate than some of the genera currently and in most cases, we believe, justifiably recognised in other tribes of the Myrtaceae (such as *Callistemon* and other allies of *Melaleuca*). The characters by which they are distinguished are not always easy to see with the naked eye - nevertheless Professor Pryor has remarked that, given an initial clue or two, "an old bushie could pick them out". Less discerning folk may not always be able to pick them out without some effort. This is true of many accepted genera. People often believe that they can recognise genera when in fact they are only identifying those few species with which they are familiar. This is particularly the case with horticulturists and foresters.

Several of the genera cited by Willis as large, variable but "universally accepted" are not so. *Prunus* has been divided by many; *Quercus* is now more narrowly circumscribed than when it included *Lithocarpus*, and the genera of Fagaceae need thorough review in any case.

By knowing to which of the eucalypt genera a particular species belongs, one is in a position to predict a good deal about its characteristics, ranging from insect pests or physiological responses to economic possibilities. This partly offsets the inconvenience caused by change from the familiar usage. Such offsetting becomes increasingly evident as time goes on.

It has been argued by some that it does not matter whether we call our groups genera or subgenera and that, as long as one knows the position of a species in the classification, the predictive value is there. The second of these statements is true, and we do not rest our case on predictivity, but on comparability within the framework of the whole family as indicated above. This is enhanced by the emphasis on relationships conferred by referral of species to the particular genera.

The practical upsets will not be as horrifying as some suggest, and there need be no legal or contractual difficulties - old and new names can still be applicable under the civil law. Younger people learning a new system will not be worried by the existence of an older and, we say firmly, inferior one. Virtually nobody now cares that *Andropogon* once covered a whole tribe of grass genera. No specific epithets will change because of the generic division, so Dr Willis' worry that there will be hundreds of new names to learn reduces to the fact that there will be reclassification to learn, with benefits as indicated.

The "Flora of Australia" may or may not adopt our new system but, naturally, we hope that it will do so. We do not accept that whether this summary work does so or not (in the first or later editions) need impose acceptance or otherwise by informed botanists and others.

Authors for sections of "Flora of Australia" and those concerned with its production have happily accepted (immediately and without discussion, so far as I know) generic changes in other groups, e.g. in the Chenopodiaceae and Loranthaceae. Those changes, although warranted, also affect a lot of literature and many past references.

Our views are firmly stated but we have ourselves considered the pros and cons very carefully and have by no means been, as some have alleged, "committed" to a particular treatment. Rather, we have reached a conclusion in the light of a great deal of evidence and feel justified in putting it forward, together with our reasons. Valid scientific judgement comes from those who have: (1) knowledge of the particular cases concerned, (2) ability to assess evidence in the light of general scientific philosophy and methodology, and (3) some flexibility of mind. We ask that, according to normal scientific ethics, until our reasons and the data have been presented and can be assessed, judgement of scientific merit be suspended and that emotive propaganda be treated as irrelevant.

L.A.S. Johnson

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SPLITTING EUCALYPTUS INTO CONFUSION

I strongly support the stand by J.H. Willis against the splitting up of this genus into a number of separate genera (ASBS Newsletter No. 38 March 1984). The splitting is possibly Australia's most important botanical decision because:

- (a) such a large number of species are involved;
- (b) eucalypts dominate in most natural areas; and
- (c) a great number of people use eucalypts and need to know their scientific names.

Taxonomically, I can not find any valid reason for separating into different genera, the 150 or so taxa that occur in southern Western Australia. This statement is based on my extensive field knowledge of the area over 25 years.

It is at the practical level that the greatest problems will occur. A great number of people use eucalypts, by their scientific names, including: researchers, foresters, biologists, land use planners and managers, nurseries, home gardeners, farmers growing shelter belts, and the general public concerned about land use planning and management. The genus is an easily recognized group to which the public can relate with confidence. Over recent years an increasing number of people have made the effort to become familiar with the scientific names of plants. Also, eucalypts are widely grown and researched in other temperate countries. Splitting the genus would mean chaos to this wide range of people. I base this prediction on many years of practical involvement with most of the above eucalypt-related activities. The recent splitting of *Casuarina* into three genera has already caused much confusion in Western Australia (at least), and loss of faith in plant taxonomists.

The splitting would also result in a great waste of money and time because herbaria and arboreta would be required to annotate or re-label many thousands of specimens. If the split does occur, then it is highly likely that within a decade a practical taxonomist will resurrect *Eucalyptus* to its present status. Then, the annotating and relabelling will be repeated.

Plant taxonomists usually work in isolation from the practical world and are rarely aware of the consequences of major name changes. An important part of a taxonomist's training should be awareness of the practical consequences of their decisions.

K.R. Newbey

GENERIC CLASSIFICATION OF EUCALYPTUS

I write in support of J.H. Willis' objections to the proposed splitting of the genus *Eucalyptus* into a number of segregate genera. I hope that, as one of our foremost systematists, his objections will receive the closest scrutiny and that he will not be forced to 'stubbornly continue to use *Eucalyptus* for all 'eucalypts' ... This would surely make 'confusion more confounded' (if this were possible) in the taxonomic field as many 'fringe botanists', technicians and laymen would undoubtedly follow his example. There is a large group of people who wish or are forced to use botanical names but have little or no knowledge of the basis on which taxonomic changes are made. These may include horticulturists, foresters, nurserymen, sawmillers, writers on horticulture, professional and amateur gardeners, Nature Reserve Officers and others associated with such work. They cannot be content with using vernacular names because these vary with geographical regions. The much wider use of Australian indigenous plants for horticulture demands greater knowledge of nomenclature in the last two decades or so. It has also developed a much wider knowledge of and interest in these plants. The influx of many more species (and forms) of plants into the market and the not-uncommon alteration of established names does lead to a great deal of confusion. Nurserymen and horticulturists, as well as gardeners, find it difficult to keep up with these changes. Commercial timber merchants will find major changes in the classification of *Eucalyptus* embarrassing.

Decisions on such matters of significance to a considerable section of the community might be more acceptable if a larger number of qualified personnel were involved than is the present practice. It seems that under the present system taxonomists even close together geographically find it difficult to come to a consensus.

In consulting local authorities, I find the following confusion in nomenclature (among others):

In Picard & Jacobs: Plants of N.S.W. (that invaluable production) I find - Leguminosae (Caesalpinaceae, Fabaceae, Mimosaceae); Asteraceae; Lamiaceae.

In Green: Census of the Vascular Plants of W.A. the equivalents are: Leguminosae sub-families Caesalpinaceae, Papilionoideae, Mimosoideae, Asteraceae, Lamiaceae.

In Jessup: A List of the Vascular Plants of S.A. the equivalents are: Leguminosae embracing all 3 in the other 2 publications, Compositae, Labiatae.

Who shall decide?

Thistle Y(Harris) Stead

BUSHFIRE!

The genus *Eucalyptus* is causing a conflagration in taxonomic circles almost as great as those it is wont to cause in the Blue Mountains or Western Victoria in a February heatwave.

Instead of shovelling fuel on the embers or taking sides with the bucket brigade, let me take a seat in the observation tower and philosophise about causes and effects of the whole sorry episode.

Taxonomy has grown in stature as a science in recent years. In academic circles, at least, the pile of herbarium specimens has moved over to make way for a variety of supposedly more objective experimental and numerical techniques, and even in herbaria the use of new methods is gaining momentum.

Chromosomal evidence has gained wide acceptance - after all, with the right equipment and skill you can see and photograph the little beasties, and the camera does not lie! Cladistics is fashionable, verging on popular, and opens the way to scientific respectability, wider prospects of research funding, new evidence and - one must suppose - new conclusions (though one suspects that some of its disciples are undermining the profits by subjectively weighting the evidence!). DNA sequencing offers the prospects of a whole new world of understanding.

I often ask myself whether we are really ready to let the understanding that we already have give way to the new insight that we might acquire from all this new effort and enthusiasm and expenditure. Are our eyes really ready for all this new light?

If so, there may well be a long series of established traditions which, like the genus *Eucalyptus*, will come under fire. If not, let's climb back up onto our high leather stools, boiled bud in dish and x 10 in hand, and get on with our studies!

Alison McCusker
Environment Policy Division
Department of Home Affairs and
Environment

Book Reviews

The Genera of Leguminosae-Caesalpinioideae. Anatomy, Morphology, Classification and Keys: L. Watson & M.J. Dallwitz. 95 pp. Canberra: Research School of Biological Sciences, The Australian National University, 1983. Price \$15.00 including postage.

Following their innovative Australian Grass Genera, the authors have applied their taxonomic and computer programming skills to produce this second book, similar in format but containing some further innovations. The Caesalpinioideae book, like the grass book, can be considered from three aspects: the methods used in its production, the fact that essentially it is a printed representation of a maintained computer data bank, and the purely botanical aspect of the work.

Production of the book was highly automated. There are several noteworthy features of the methods used in its preparation. The high information content of the descriptions results from the provision of character-state definitions coupled with the mention of all characters in each description where information is available (otherwise the character numbers are listed as "not coded" at the end of each description, i.e. absence of data is explicitly indicated). Automation of key production has permitted presentation of eleven keys, most being to either systematically or geographically restricted subsets, plus one to widely cultivated or adventive genera. The further possible restriction of keys to certain character types has not been used here except to exclude anatomical features from all keys. The basic data (originally entered into the computer in a special coded format developed by Dallwitz and known as

DELTA, was converted to full word (i.e. natural-language) descriptions by the computer program CONFOR to form the bulk of the book, 177 descriptions of genera. CONFOR was also used to convert the data into formats suitable for two other programs, one for producing keys, the other for performing classificatory analyses. Finally all the text was type-set using another computer program and the book was printed from camera-ready copy. Compared with the earlier book on grass genera, in this book the typography has been improved, and changes to CONFOR have enabled the option of more readable descriptions as presented here, through the deletion of redundant wording and the somewhat distracting angled brackets and character numbers. This was not without some information loss, as the authors point out.

Because the data are stored on computer they are readily updateable; because the production of the book is in large part automated, new editions can be prepared relatively easily. New editions of keys appearing in the grass book have already been issued on microfiche. All of this means that publications such as the Caesalpinioideae book are unattractive to conventional publishing outlets. Thus a form of private publication was adopted.

The Caesalpinioideae, a chiefly tropical group, have been dealt with in their entirety here, together with the Swartzieae which, as the authors point out, are now generally thought to be best placed in the subfamily Papilionoideae. This work is not intended as critical at the level of generic delimitation, although comments are made on a couple of doubtfully defensible genera. The subdivision of *Cassia* has not yet been incorporated. Rather, it is as an information source on the caesalpinoid genera that the book is valuable. The descriptions are detailed and based on both compiled data and new observations. There is a good deal of anatomical information, most of it original. A new classification is presented, derived from phenetic numerical analyses, which differs only moderately from that presented in Polhill & Raven, Advances in Legume Systematics, most notably by not supporting the distinction of the Amherstieae from the Detarieae.

The authors are to be commended for the full presentation of their data, the extensive discussion of their methods, the offer of access to the data and provision of material based on it upon request, and their successful efforts to arrange publication at an affordable price.

Terry Macfarlane

Extinct and Endangered Plants of Australia: J. Leigh, R. Boden & J. Briggs. Pp. viii, 369; 32 unnumbered pages of colour plates. South Melbourne: Macmillan, 1983. Price: \$49.95.

This is a very useful book, although given the rate of exploitation of the environment as well as the present botanical activity in surveys and taxonomy, it can hardly be definitive as claimed by the dust jacket. Nonetheless, it comes close to achieving its aims: to provide details of Australia's extinct and endangered plants, and to stimulate both further study and better conservation. If it does not succeed fully it is mainly from not checking the accuracy of every detail, a difficult task under the constraints of funds and time that always apply in such a project. Conservationists no doubt will quickly take the book as an authoritative tool in their various campaigns. Botanists will accept the challenge to improve the data and, I hope, more vigorously seek species presumed extinct.

The first four chapters set the scene, covering the historical aspect, the importance of plants to Man, how plants become extinct, and the Australian

vegetation. Chapter 5 covers threats to Australian plants and Chapter 6 looks at means of conservation. These are difficult topics to treat concisely but the authors have done well.

Chapter 4 is perhaps an oversimplification of Australian vegetation types - for example, the section on Shrubland covers, according to the map on p. 18, much of the deserts, but there is no mention of the *Triodia* formations in those regions. It also leads to some odd placements in the allocation of species to vegetation types: e.g. *Kennedia glabrata* occurs on granite outcrops, not in woodland, and *Roycea pycnophylloides* (a halophyte) does not occur in scrub.

The figures show clearly that agriculture has been and remains the chief threat to our flora, followed by grazing, competition from weeds, and roadworks (is this because most collectors do not walk far and hence miss other populations?). Other threats including mining, are some distance behind though cumulatively significant.

It is sad that so few (65) of the species described in the book are grown in botanic gardens. Surely these institutions must take up the task of bringing as many as possible into cultivation. The National Botanic Gardens, in a location less suited naturally to native plants than most others, has set a lead here.

The case studies of 279 endangered and presumed extinct species provide for each, in a mixed telegraphic/normal prose style, a description, rarity/conservation status, meaning of the species epithet, habitat, distribution, threats, reservation, cultivation, recommendations and references. The text is rather wordy - the descriptions could easily be reduced to half their length and remain adequate for this book.

The authors have done a commendable job to bring together data scattered through literature, on herbarium sheets, in botanists' heads and in the field. Inevitably there are errors that could have been avoided with further checking, but there is a limit to what can be achieved from these sources. For example, the Preiss locality Mt Eliza, discussed under *Trymalium albicans* (p. 311) is clearly that in Kings Park, Perth, not one of the more remote hills of the same name. In the account of *Rhizanthella*, two errors that should not have occurred are the locality Manglinup (correctly Munglinup) and the name Dickson (correctly Dixon), the latter repeated in the References.

The botanical names are generally accurate, but the ending - *eranus* has been used instead of the change back to '*erianus*'. On p. 143 I noticed *Loudonia*, instead of *Glischrocaryon*.

The book contains two indexes, always an annoying feature but the more so here since they are inadequate. There is a Species Index (which also contains entries for families, genera and common names) and a Subject Index (which also contains many species, mainly grouped under headings such as 'cultivation', 'ornamental plants' and 'symbolic plants'). Species are indexed only to the case studies, making it circuitous to locate an illustration and impossible, without reading the early chapters, to trace species discussed and listed there.

With only 32 pages of colour the book is greatly overpriced, which means that it may not reach as wide a readership as it deserves. The plates are mostly very good (though *Thelymitra epipactoides* is upside down), but the many small half-tone photos of herbarium specimens rarely show enough detail to be of much use. Both the colour plates and their pages are unnumbered.

On the back flap, the credits for the jacket photographs are transposed. The front cover shows eroding sand threatening *Banksia integrifolia*, one of the most common species of that genus.

Alex George

REQUEST FOR LAWRENCIA AND SELENOTHAMNUS

Staff of the National Herbarium of Victoria will appreciate any efforts any collectors can make to assist in building up a representative set of all species of *Lawrencia* and *Selenothamnus* (Malvaceae) at MEL. Our previous collections of these, 239 specimens including 20 types, were incinerated on the Nullarbor en route back from Perth, a fire that also burnt out the transporting vehicle and the collections of HO. With our collections of these two genera now at zero (except for 19 *Lawrencia* which Perth has so far been able to provide) we will obviously be glad of duplicates as they become available and are therefore making this special request.

Helen I. Aston
Curator of Herbarium Collections,
MEL

Honours

Professor H.T. Clifford

The past president of the Society, Trevor Clifford, has been honoured by the University of Queensland with a professorship. He gave his inaugural professorial lecture, entitled "Taxonomy, Tradition and Technology", on 9 May, 1984.

Dr L.A.S. Johnson

On behalf of the members of ASBS the Council congratulates Dr Lawrie Johnson on being awarded the Mueller Medal for 1984. The Society nominated Lawrie for the medal last year for his important contributions to the field of botanical systematics, and to the theory of biological systematics, to the knowledge of the flora of Australia and to the understanding of Gondwanan biogeography.

The Mueller Memorial Medal honours Baron Sir Ferdinand von Mueller and may be awarded at each ANZAAS Congress to a scientist who is the author of important contributions to anthropology, botany, geology, zoology or biology, preferably with special reference to Australia and published within the British Commonwealth.

Judy West
Secretary

CONCERNING DATES OF PUBLICATION

In an effort to clarify publication dates of the journals produced in the 1850's by the organizations which were predecessors of the Royal Society of Victoria (namely the Victorian Institute for the Advancement of Science, the Philosophical Society of Victoria, and the Philosophical Institute of Victoria). I have sleuthed through various newspapers, etc. for tell-tale clues. An account of the investigation and a table summarising results has now been published in *Muelleria* 5: 281-288 (1984). Reprints are available from me for anyone finding themselves in trouble with plant names that appeared in the journals of the above scientific bodies.

Helen I. Aston
National Herbarium of Victoria

LICHENOLOGY COURSE

An "Introduction to Lichenology" course will be run at the University of Queensland from 27-31 August, 1984. The course is designed to introduce participants to the study of lichens, and especially to develop the skills to name them. Lichens from the Brisbane area will be available but if participants wish to bring some local material from their own areas, that can also be used. The fee will be \$120.00 not including accommodation and meals. For further information about the course contact Dr R.W. Rogers, Dept. of Botany, University of Queensland, St. Lucia, Qld. 4067 (ph (07) 377 2727) or Continuing Education Unit, University of Queensland (ph. (07) 377 4040).

CENTENARY OF THE DEATH OF GEORGE BENTHAM

George Bentham, author of *Flora Australiensis*, *Flora Hongkongensis* and a number of taxonomic papers, and joint author with Joseph Hooker of *Genera Plantarum*, died in London on 10 September 1884. His influence on taxonomic botany is still considerable, especially in Australia where his *Flora* has remained a standard work. The centenary of his death is an appropriate occasion to remember a botanist whose name is probably mentioned more than any other who has worked on the Australian flora. I have written to the Royal Botanic Gardens, Kew, to ask if anything is planned in Britain. In the meantime local chapters of ASBS may consider what should be done here. One suggestion is to hold meetings on that day, with lectures on Bentham and his work.

Alex George

AUSTRALIAN NATIONAL HERBARIUM

The Minister for Science and Technology, Mr Barry Jones, has approved the renaming of Herbarium Australiense as the Australian National Herbarium. The change of name does not signify any change in the function or management of the collection, which will remain in the custody of CSIRO. This article provides a brief history of the Herbarium, a summary of present activities, and an outline of the need for the change of name.

Shortly after the Council for Scientific and Industrial Research was established in 1926 it commissioned a report from Dr Arthur Hill, who was then Director of the Royal Botanic Gardens at Kew. Hill visited Canberra in 1927, the year the Capital was founded. In his report he recommended that CSIR

establish a National Herbarium in Canberra, and also that a Botanical Liaison Officer be appointed to Kew. However in 1928, mostly for financial reasons, CSIR decided that "the question of establishing a Commonwealth Herbarium should be postponed for several years".

Nevertheless a herbarium did inevitably develop in CSIR for several reasons. Collections were donated to or purchased by the Commonwealth of Australia, and voucher specimens accumulated through the early research of the Organization. A reference collection for plant introduction work and research on weeds and poisonous plants was needed. In 1929 Mr J. Calvert was appointed to CSIR, and began with a training session at Kew before coming to Australia in 1930. He soon organized the embryonic collection, which numbered 1000 specimens in June 1930 and 2500 in June 1931.

It was apparently Calvert who chose the original name of the Herbarium, although he committed the grammatical sin of producing labels with the name "Herbarium Australiense". It seems that this name was chosen partly in deference to the large National Herbaria in Sydney and Melbourne.

Use of the name Herbarium Australiense lapsed for a time, and the herbarium grew somewhat spasmodically as a succession of officers had responsibility for it. By 1937 the Herbarium had received as gifts or bequests important collections such as those of C. E. Carr and the Lucas Marine Algae, donated specifically to the Commonwealth of Australia. The Herbarium was becoming more general and more national in character, and in 1946 the first full time systematic botanist, Dr Nancy Burbidge, was appointed. About this time CSIRO began its land use research surveys, and the collections grew in a balanced way.

By this time labels with the correct spelling of Herbarium Australiense were in use. However in the first five editions of Index Herbariorum, from 1952 through to 1964, the Herbarium was simply listed as "Division of Plant Industry, CSIRO". It is only since the sixth edition of 1974 that the title "Herbarium Australiense" has been included in the entry.

An important step in rationalization of the collections held in CSIRO occurred in 1973. The two herbaria maintained in the Divisions of Plant Industry and Land Use Research were physically united, and the professional staff of the two were brought together in a single unit for research in Australian plant taxonomy. The present Herbarium has developed from this nucleus. It now has about 500,000 specimens, and is truly comprehensive and national in character. It is of course much smaller in size than the National Herbaria of New South Wales and of Victoria, but of the same size order as the other State Herbaria. The collections are of high quality, and are relatively well housed. It is not a regional collection; in fact its main development target is a balanced representation of the Australian flora to support basic flora research. In March 1975 Herbarium Australiense was gazetted by the Australian Government as a "...representative collection of the plants of Australia and adjacent territories...". The gazettal "...emphasizes its status as a national heritage, which is the responsibility of the Australian Government to preserve and further develop...".

Over the last few years the concept of Herbarium Australiense has been extended to include the two CSIRO herbaria located in the Division of Forest Research, and the new name Australian National Herbarium is applied in the same way. The Australian National Herbarium thus embraces all major plant collections held by CSIRO, including the comprehensive collection in the Division of Plant Industry at Canberra (CANB), the specialist Eucalypt collection in Canberra (FRI) and the specialist tropical forest collection at Atherton (QRS). It should be noted, however, that these three herbaria are still administered independently, although some aspects of their development and operation are co-ordinated.

Through its period of development there has been a growing commitment to basic flora research associated with the Herbarium, and this now represents the main activity of the Herbarium staff. The utilization of the collections as the basis for research in flora inventory and in patterns of variation and differentiation is strongly promoted. In conjunction with a comprehensive taxonomic library, the collections are supporting basic taxonomic research in several families at the present time, including Portulacaceae, Caryophyllaceae, Amaranthaceae, Boraginaceae, Poaceae, Asteraceae, Loranthaceae, Rutaceae, Apiaceae, Myrtaceae and others.

In some of the projects emphasis is being given to experimental and analytical studies as aides to taxonomic decision-making on sound biological grounds. These include studies of reproductive biology, which may provide useful data on control of gene flow in natural populations, and experimental garden work, which can show the degree of isolation between species and the significance of environment as a factor in variation. They include analysis of phylogenetic relationships through cladistic methodology, and use of computer databases for key construction and description generation. Scanning electron microscopy is being utilized as a tool in morphological and development studies and isozyme studies are contributing to an understanding of genetic diversity.

There are several reasons for changing the name of the Herbarium; the former name is now rather unsuitable and the new name will be an avenue to good development of the collection, and may even benefit the overall functioning of plant systematics research in Australia. The former name, as a latin binomial, is out of character with the general naming of sections and collections in CSIRO, and in this respect is possibly a disadvantage. In any case it does not necessarily convey a clear meaning of the nature of the collection. Latin binomials as herbarium names do occur, but they can convey meanings such as: collections representing a specific area, or based in a specific place, or collected by a specific person, or even honouring a specific place or person. As a result, under the name Herbarium Australiense the collection has not been universally recognized as an important, stable, government-sponsored collection with an active research program. Both within Australia and overseas it has often been necessary to explain the status of the Herbarium to people for whom the name did not provide a clear picture.

In contrast, the name Australian National Herbarium describes the status of the Herbarium unambiguously in our own national language. Importantly, it is consistent with the nomenclature of other gazetted national collections in CSIRO, such as the Australian National Insect Collection and the Australian National Wildlife Collection. The name is also consistent with usage in many other countries where there are similar government-maintained botanical collections. For example, the title "National Herbarium", preceded or followed by the name of the country, has been adopted in a spectrum of countries ranging from the United States, Canada and South Africa to the Philippines, Costa Rica, Sri Lanka and Trinidad and Tobago; the complete list is quite substantial.

We hope that the naming of an Australian National Herbarium will be seen as an asset for the future of the collection and for systematic research in Australia. It removes a name which is somewhat anomalous and not very informative, and substitutes one which is simple, accurately descriptive, consistent with the history of the collection and internally consistent with the naming of other national biological collections in CSIRO. In terms of international communication in systematics research, it is hoped that the new name will facilitate more effective exchanges of scientists, specimens and funding.

Bryan Barlow

The Society

The Australian Systematic Botany Society is an association of over 300 people with professional or amateur interest in Botany. The aim of the Society is to promote the study of plant systematics.

Membership

Membership is open to all those interested in plant systematics and entitles the member to attend general and chapter meetings and to receive the Newsletter. Any person may become a member by forwarding the annual subscription to the Treasurer. Subscriptions become due on the 1st January.

The Newsletter

The Newsletter appears quarterly and keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition original articles, notes and letters (not exceeding ten pages in length) will be published. Contributions should be sent to the Editor at the address given below, preferably typed in duplicate and double-spaced. All items incorporated in the Newsletter will be duly acknowledged. Authors are alone responsible for the views expressed. The deadline for contributions is the last day of February, May, August and November.

Notes

- (1) The deadline for the next Newsletter is 31st August.
- (2) ASBS Annual Membership is \$13 (Aust.) if paid by 31st March, \$15 thereafter. Students (full-time) \$10. Please remit to the Treasurer.
- (3) Advertising space is available for products or services of interest to ASBS members. Current rates are \$30 per full page, \$15 per half page. Contact the Newsletter Editor for further information.

Mailing List

All address changes should be sent to the Treasurer or the Editor.

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